The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXVII: No. 21. *New York, Thursday, May 26, 1881.* *$4·50 a Year, Including Postage. Single Copies, Ten Cents.*

The Continuous Rod Mill of the Trenton Iron Company.*

BY WILLIAM HEWITT.

This mill was designed by Mr. Charles Hewitt (my father), since deceased, and operates on what is known as the Belgian system—that is, the billet is first roughed in a set of breaking-down rolls, and from them conducted through a series of passes in a train of smaller rolls, driven at a higher speed, and connected in the ordinary way by wabblers and coupling boxes, the peculiar feature of the system being that the rod, as it issues from each pass in the latter rolls, is turned by hand and entered in the next succeeding pass, so that it is operated upon in several passes at the same moment, as in a continuous mill. Very long rods can be rolled in this way, weighing from 80 to over 100 pounds.

But the mill owes its peculiar interest not so much to the system of handling the material, as it does to the manner in which it is driven and the simplicity of its mechanism. With the exception of the roll pinions it contains no gearing. The breaking-down rolls are coupled direct to a high-speed Corliss engine, and the train is driven from the fly-wheel through a double leather belt 26 inches in width, made by J. B. Hoyt & Co.

The mill embraces also two heating furnaces, with a peculiar arrangement of boilers attached to them, on which the company own a patent, a fan for supplying the blast driven by a small independent engine, a pump and a feed-water heater. Connected with the mill also are two 60-horse-power Babcock & Wilcox tubular boilers; but these, with the furnace boilers, are more than sufficient to supply the necessary amount of steam, and the surplus goes to other parts of the works, the boilers throughout communicating, so that these should hardly be included as a necessary part of the plant. At the same time, the furnace boilers alone are scarcely adequate, as the furnaces are damped at each fresh charge of billets, which affects considerably their steaming capacity. If the furnaces were fired for steam only, the boilers over them would probably do the work, and, indeed, the mill has been run with them on several occasions, independently of other boilers, but the steam pressure dropped gradually from 75 to about 30 pounds. At one time, in attempting to roll steel at the latter pressure, the engine was stalled. The mill, however, will roll iron, if well heated, with a steam pressure of 35 pounds.

The furnaces are of the ordinary kind, fired with bituminous coal, and consume about half a ton (2000 pounds) to the ton (2240 pounds) of rods. The boilers consist simply of plain cylinders, A A (see Figs. 1, 2 and 3) two in number, over each furnace, 29 feet in length and 3 feet in diameter, with short drop cylinders, B B, of the same diameter, suspended from the ends adjoining the stack, 6 feet in length and filled each with

*A paper read at the Hartford meeting of the American Society of Mechanical Engineers.

Fig. 1.—Elevation of Furnace and Boiler.

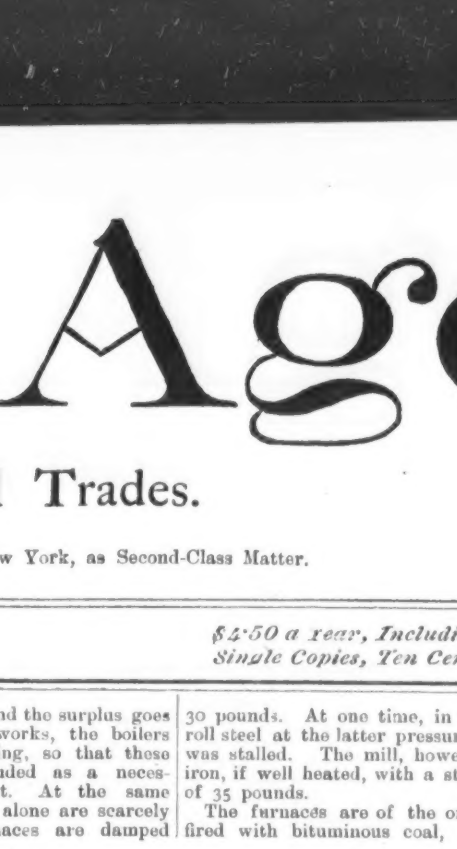

Fig. 2.—End Elevation.

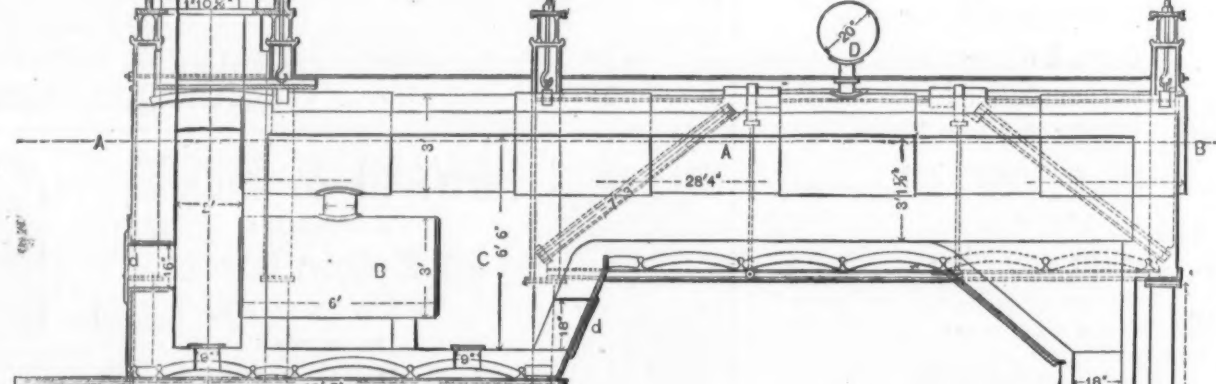

Fig. 3.—Plan of Furnace and Boiler.

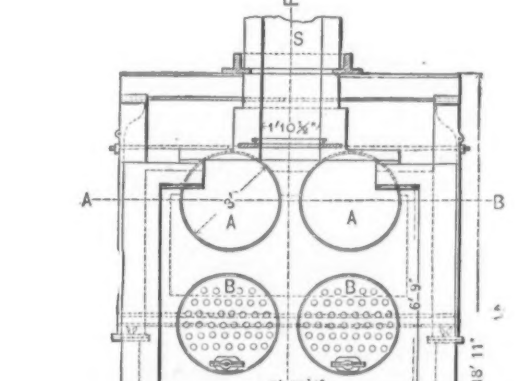

Fig. 6.—Eccentric.

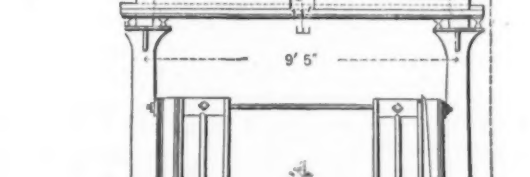

Fig. 7.—Eccentric Strap.

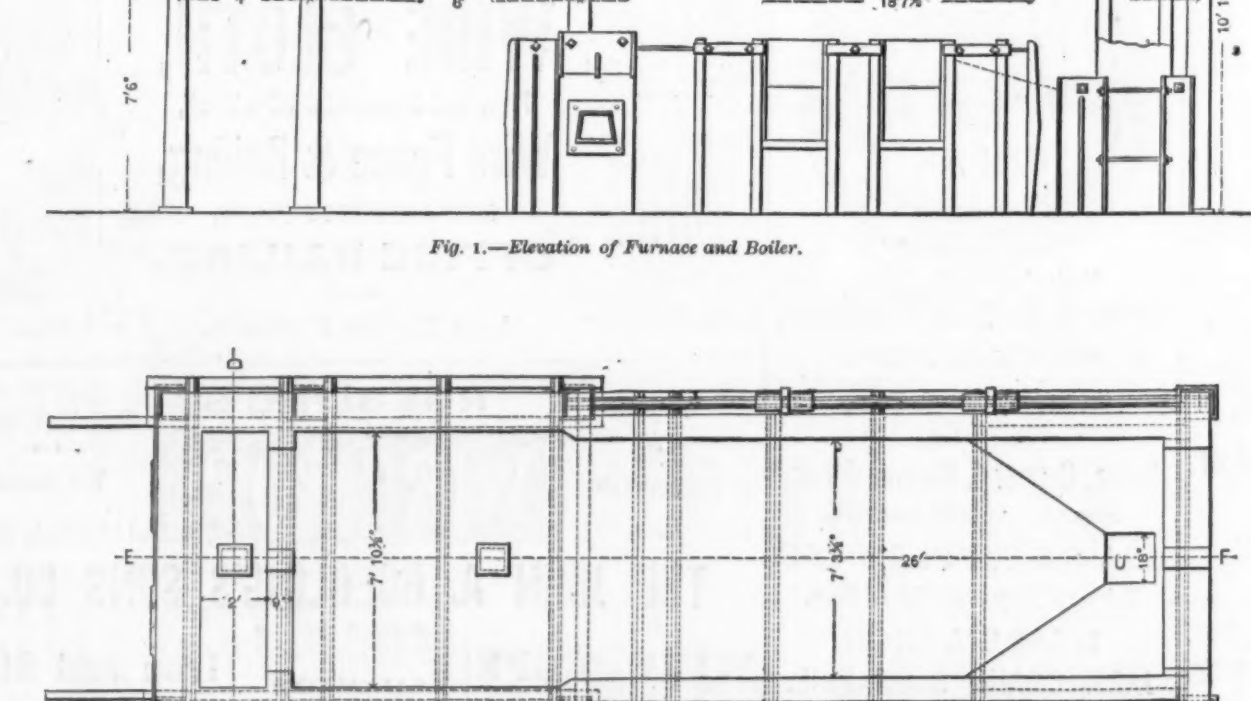

Fig. 4.—Elevation of Corliss Mill Engine.

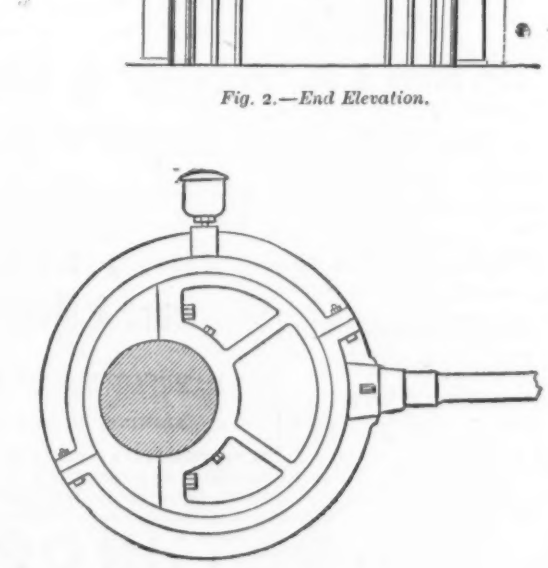

Fig. 5.—End Elevation.

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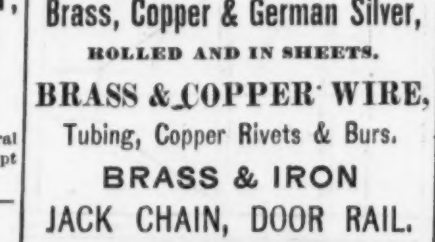

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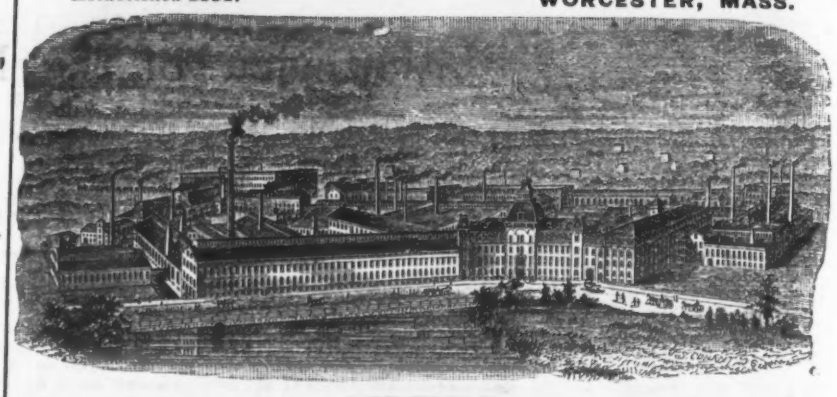

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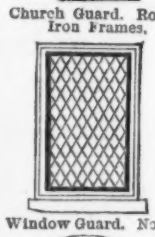

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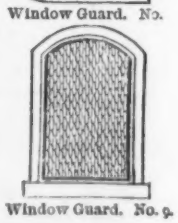

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56 3-inch tubes. The flame from the furnace, conducted by the uptake U, strikes the ends of the plain cylinders A A furthest from the stack, passes along under them about three-fourths of their length, then drops into a chamber, C, which acts as a kind of combustion chamber, passes through the tubes of the drops B B, and thence up the stack. These boilers, judging from the quantity of water they take, generate about 30 per cent. more steam than plain cylinders alone would generate similarly placed. The heat from the furnaces is so well utilized that a man can put his hand in through the doors *d d*, just behind the drops at the foot of the stack, without much inconvenience, while the furnace is in operation. No flame ever issues from the top of the stack, and the damper E is placed at the foot just above the boilers. Each pair of boilers joins into one steam drum, D, and doors, *d d*, directly in front and behind the drops are provided, so that the tubes can be readily cleaned, which is done every Saturday.

The most interesting feature of the mill, perhaps, is the engine, which was built expressly for the purpose by the Corliss Steam Engine Company, of Providence, R. I. The diameter of the cylinder is 20 inches; length of stroke, 42 inches, and number of revolutions 100, giving a piston speed of over 1100 feet per minute. It operates on the general principle familiar to all, but the mechanism is modified somewhat to accord with its speed and to insure a more prompt action of the valves, all the parts fitting loosely and yet being rigidly secured. Small sensitive springs, *s s* (see Fig. 4), operate the latches *l l*, lifting the valves *v v*, which are thrown out at the proper moment by trips, *t t*, actuated from the governor, and the dash pots are so arranged as to allow of a more rapid escape of the air from underneath the plungers at the moment of cutting off, being pierced with several small holes, that are plugged up one at a time as the plungers wear, so that the latter may not drop too quickly.

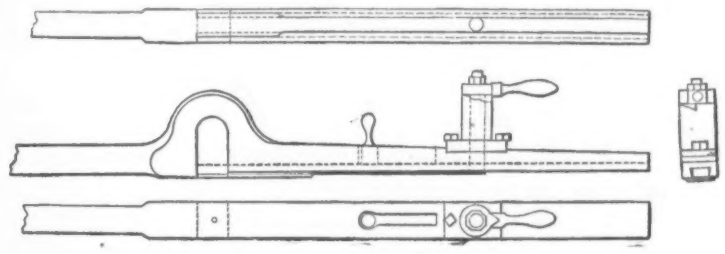

Fig. 8.—Eccentric Rod Latch.

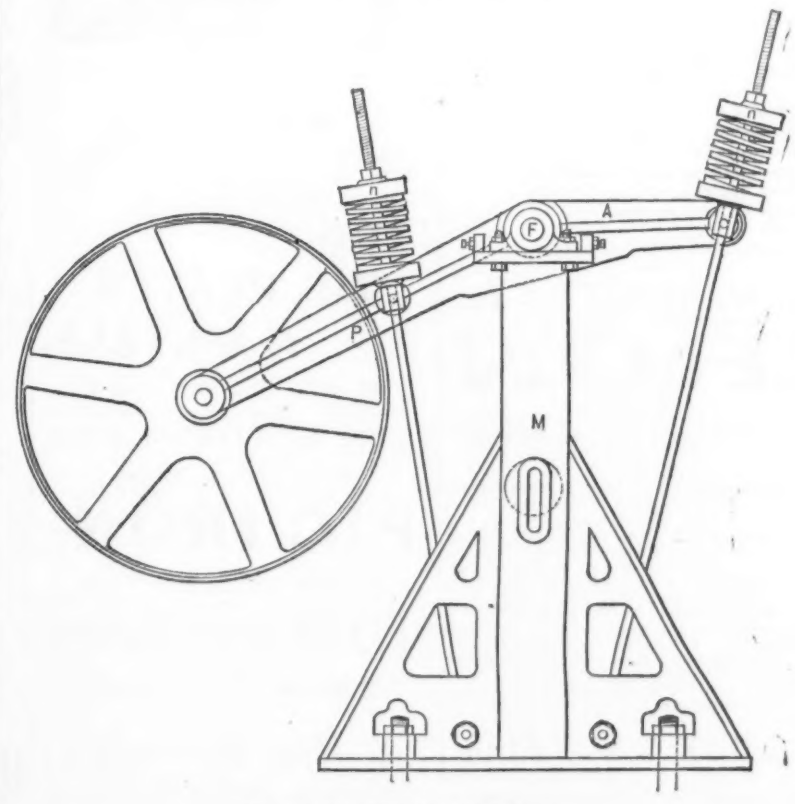

Fig. 9.—Side Elevation of Tightener.

A No. 4 Niagara pump, in connection with the feed-water heater, supplies the water both for the furnace and Babcock boilers. The heater consists simply of a large rectangular cast-iron box, containing about 430 feet of 1¼-inch wrought-iron pipes, the water passing through the pipes and the exhaust steam from the engine around them, feeding the water to the boilers at a temperature averaging from 185 to 200 degrees. In the previous heaters used at the works the steam passed through and the water around the pipes, but for some reason which I am not quite able to explain, this disposition of the materials caused the pipes to corrode quite rapidly, becoming completely honeycombed in the course of a few months, so that they had to be frequently renewed. With the present heater, however, the first renewal has yet to be made, and the pipes are still in fair condition.

The exhaust port is 8 inches in diameter, expanding into a 12-inch pipe. The latter originally was only 8 inches in diameter, but the pack pressure choked the engine too much, and it was subsequently changed.

The connecting rod brasses are provided with a peculiar arrangement of set-screws that prevents them from clamping the pins too tightly, and, at the same time, allows them to be rigidly keyed to the rod. The connection with the cross-head is lubricated with oil by a hole in the center of the wrist-pin, communicating with a number of small radial holes opposite the connecting-rod bearing. The crank pin, however, requires the best white tallow. Ordinary lubricating oil is too thin, and would be thrown out in all directions. The cup holding the tallow contains a small loose copper rod, that plays up and down against the pin and the cap of the cup, for the purpose of working it

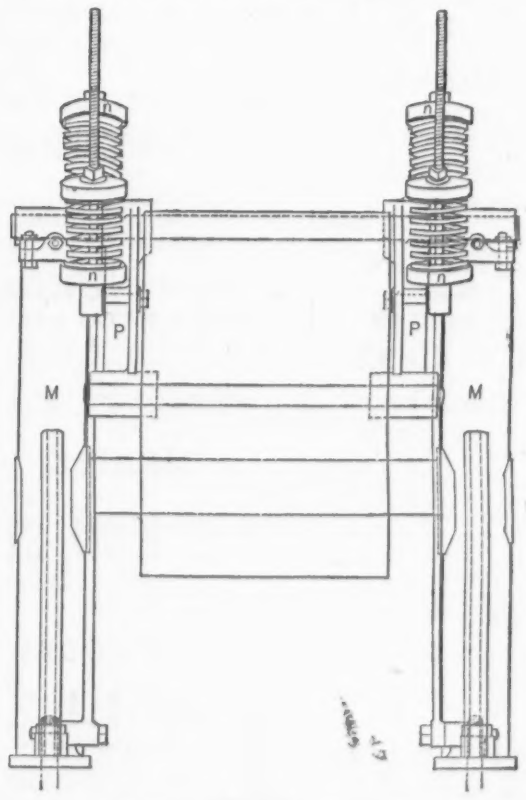

Fig. 10.—End Elevation of Tightener.

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tallow down, and also serving as a conductor of heat to melt it more freely as the parts become warm. This copper rod is quite essential to the ease of the crank-pin, and performs its functions so well that the pin never becomes overheated, but keeps just moderately warm all the time. I regret that the haste with which this paper was prepared has not allowed me to present a detailed illustration of these devices.

The crank is of the disk-wheel pattern, carefully balanced, and the shaft is 8 inches in in diameter. The fly-wheel is i i one piece, 10 feet in diameter, and weighs something over 16,000 pounds. It has wrought-iron bands shrunk upon each side of the hub. The small pulley driving the train is 54 inches in diameter, and weighs a little over 4000 pounds. The faces of the wheels are 28 inches width, and the distance between their centers 16 feet. The center of the small pulley is a little below that of the fly-wheel, on account of the train being lower than the breaking-down rolls, in order that its driving shaft, S, may pass under the floor behind the latter rolls, and thus give a clear space for the iron to play upon.

Since the mill was started several improvements have been added to the original design of the engine, but not in any way affecting the principle of the valve motion. The eccentric rod, as first arranged, frequently shook loose from the valve gear, notwithstanding the latch provided for securing it; and several devices were tried without successfully meeting the difficulty, until the present latch (see Fig. 8) was applied, which was designed by James Withington, the foreman of the Trenton Iron Co.'s works.

The originalj eccentric threw the oil out, so that it was impossible to keep it cool. This difficulty was overcome by altering the strap (see Figs. 6 and 7) so as to confine the eccentric and make it impossible for the oil to escape.

The valve supports *s s* (see Fig. 5) broke, and the support *o* for the wrist-plate gradually worked loose, the former being replaced with heavier castings, and the latter stayed at the end just outside the plate by a small standard.

The first tightener consisted simply of a lever, with the fulcrum at one end resting between two upright cast-iron columns and the pulley at the other supported by the belt, the lever cushioning upward against two nests of car springs, inclosed in cups, secured to the main standard by rods. The fluctuations of the belt were such, however, as to cause the pulley to thump seriously against it, so that it had to be continually taken up. In the present tightener (see Figs. 9 and 10) the lever is provided with arms, A, extending from the opposite side of the fulcrum F, and also cushioning against nests of car springs, N N, like those on the pulley arms P P, and similarly attached to the main standards, M M. These relieve the belt from the sudden shocks to which it was before susceptible, and at the same time allow to some extent for its fluctuations. The arrangement works so nicely, indeed, that the motion of the arms is almost imperceptible.

Since these alterations were made the engine has given no trouble whatever, and the repairs on account of wear and tear have been comparatively trifling. The valves now need reboring for the first time, but the cylinder is still in good condition, and smooth as a mirror. The belt has required no taking up since the present tightener was applied, has stretched but very little, and shows no signs of giving out. It has never slipped but once, and that was owing to the carelessness of the engineer, who dropped some grease on it. The little springs S S (see Fig. 4), operating the cut-off latches, give out frequently, but several of these are always kept on hand, and the arrangement is such that they can be replaced at a moment's notice.

The pinions, both on the breaking-down rolls and on the train, are of the V-toothed pattern, made by A. Garrison & Co., of Pittsburgh. The original set on the former is still in use, but that on the train was replaced by a new set in December last, the teeth being worn so thin that it was unsafe to use them longer.

The roll-neck bearings are made of phosphor-bronze from Geo. K. Tryon, Son & Co., of Philadelphia, and some of the original castings are still in use. Three months was formerly considered a fair life for roll-neck brasses.

The rod as it leaves the last pass in the train is coiled up by a steam reel, on which the company own a patent. This reel is so constructed that a boy, seizing the end of the rod as it issues from the train, can enter it in the guides without letting go his hold, and attach it to the pins of the reel while it is in motion, so that it is immediately coiled up and not likely to become entangled on the floor. The reel is instantly stopped by pressing on a treadle that shuts off the exhaust and at the same time contracts the pins slightly toward the center, so that the coil can be easily and quickly removed when it is wound.

The mill has been in constant operation now day and night for four years, or, at least, has run as steadily as most mills of the kind since it was started During this time it has rolled about 20,000 tons of No. 4½ round rods from 1½ inch square billets, or an average of over 400 tons per month, the largest product for any one single month being 750 tons. The mill, however, is capable of turning out about 800 tons of rods per month, driven to its full capacity.

A comparison of the duties on British exports to France under the existing commercial treaty tariff and the new general tariff shows that, while various articles in the iron trade are not seriously affected, the increase on textile fabrics is enormous, often double and sometimes treble. The general increase is from 40 to 60 per cent.

Leading Philadelphia papers argue that the Gas Trust of that city, which, of late, has proved to be an expensive appendage of the city government, should be relegated to some private corporation; that it is not the business of the city to earn anything, but to govern. This conclusion may be accepted as good logic.

American Society of Mechanical Engineers.

MEETING AT HARTFORD, CONN.

(Concluded.)

Mr. H. F. J. Porter next read a paper on

THE BINARY ABSORPTION SYSTEM OF ICE MACHINERY.

All systems of ice machinery of the present day are based upon the principle of volatilization and subsequent condensation of a liquid, or the converse of a gas. The requirements of the case are such as to greatly restrict us in our choice of liquids, &c.

1. It must be volatile at low temperatures and at pressures not much below the atmosphere, otherwise we could not obtain the necessary degree of cold and have difficulties with our pumps.

2. It should not reach high pressures, even at considerable temperatures, as in the tropics, for leakage would be excessive.

3. It must be stable in composition, even after repeated evaporations and condensations. Some liquids which have been used for the purpose undergo chemical changes to such an extent as to require high pressures for their condensation after short use.

4. It must have no action on lubricating substances.

5. It must have no action on the metals used in machinery.

6. Be uninflammable and non-explosive.

The machinery should be simple, the plant small and economical of power, and consequently of fuel. The cost of production of ice or of cold must be small.

Here the speaker reviewed some of the leading systems that have been used.

Compressed-air machines have given less satisfaction than any others. The low conducting power of air requires large vessels for absorbing its heat. The moisture in the air is frozen and clogs the valves and pipes. Drying of the air is impracticable, and we find glycerine the only available lubricant.

Ammonia machines use either liquid ammonia or liquefied ammonia gas, Carré using the former and Tellier the latter. Gaseous ammonia needs a pressure of 180 to 250 pounds to reduce it to a liquid at 75° or 80° F., and, while it gives very low temperatures, the joints are kept tight with difficulty. Grease cannot be used in lubrication, as it is at once saponified, while the gas attacks copper and cast iron (owing to pressure).

Ether machines have a fluid with an unusually low tension, only 3 or 4 pounds per square inch at 27° F. The pump, however, must work under very nearly a vacuum, consequently the entrance of air at the stuffing boxes can scarcely be prevented. The ether, therefore, becomes oxidized in consequence, and the working of the machine is impared. The product is not staple, and soon decomposes into isomeric compounds which are less volatile. No grease can be used in lubrication. Leaks are dangerous, as the vapor is highly inflammable. The pressures rarely exceed 100 pounds per square inch.

Machines using petroleum derivatives such as chymogene, rhigoline, gasoline, &c., have the disadvantages of low tension, inconstant product and high inflammability.

Anhydrous sulphurous dioxide.—This substance is liquid at 14° F., and has a pressure of from 45 to 55 pounds per square inch at a temperature of 60° or 65° F. It has no effect on grease, and is itself a lubricator, and has no effect on metals. This system of ice machinery is the invention of Raoul Pictet, of Geneva. The substance is stable and not inflammable. It must be anhydrous, as water at once transforms it into sulphuric acid. Minute holes in castings admitting moisture and producing corrosion gradually increase until, under the internal pressure, the gas escapes. This is a common occurrence.

The question then comes up: Can we not combine the low pressures of one liquid with the greater cooling powers of others, and at the same time avoid some of the great difficulties which the single liquids present?

Mr. Tessie Du Motay and Mr. Auguste I. Rossi, of New York, have been experimenting with the ethers and their alcoholic radicals, and find that they possess an absorbing power for gaseous sulphurous anhydride, amounting in some cases to 300 times their own volume of the gas. They have obtained a liquid which had no pressure at 60° F., and some which had none at 90° F. These liquids were non-inflammable. The liquid chosen is ordinary ether saturated with 50 per cent. of sulphurous dioxide. With this binary liquid intense cold is produced—greater, indeed, than theory calls for.

The machine used is not unlike the well-known type of ether machine, save that there are a few modifications of detail. Almost any machine may be adapted to the use of the binary fluid. Ammonia machines, however, would have too small gas pumps, although the steam power would be too large. Sulphurous dioxide and some other machines would need gas pumps of double size, while the steam power would be ample.

For the mechanical work of compression necessary to liquefy the dioxide in the binary liquid, is substituted the power of affinity and the absorption of the liquid ether for gaseous sulphuric dioxide. In the binary liquid gas pumps no grease is used, and the pressures when running range from 10 to 15 pounds; at rest the pressure is from 0 to 2 pounds. Water sets up actions which result in the production of sulpho-vinic acid, which is very weak.

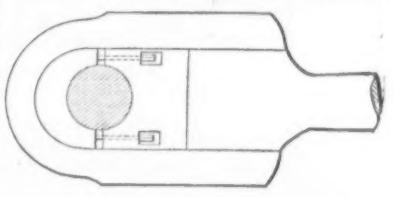
In conclusion, the author gave some interesting facts in regard to the practical working of the machinery, the freezing of water and the use of boiled or filtered water for the purpose of making ice. A table was also given showing a curve of congelation, and the thickness of ice formed every hour for 24 hours. The writer concluded with a short statement of the immense importance of ice machinery in all parts of the world, and for various purposes. The cost of making ice in a machine capable of making 3 tons per day is about $3.33 per ton, which is reduced to 92 cents in a 25-ton machine and 80 cents in a 50-ton machine. These figures are made upon the basis of coal at $4 per ton. At this figure the cost of fuel is half of the working expenses in the larger machines.

The next paper was by Mr. Johnson, on

THE WESTERN STEAMBOAT CAM.

To the steam engineer this was a paper of considerable interest, but, as all the drawings were not ready upon the board, it was hardly intelligible. Cams are very generally, if not universally, used in the West for steamboat valve gear instead of eccentrics. They open fast, hold the valve open to the last moment and then shut quickly. They are made of cast iron, and are usually finished by the file or by chipping. The art of laying out of these cams, which is very instructive, was described at some length, showing the steps necessary for full-stroke and cut-off cams. They are put into frames or yokes, by which they drive the valve rods. The cut-offs effected by them are not uniform in both strokes, and, owing to a variety of circumstances, the point of cutting off is less than that at which they are laid off. The paper closed with some account of the details of construction and their applications.

Mr. Hewitt read a paper on "The Continuous Rod Mill of the Trenton Iron Company," which we print in full elsewhere. The accompanying additional diagram is



from a hasty sketch made upon the blackboard, and shows the crank-pin brasses and the arrangement for holding these firmly just in their proper positions, without allowing them to bind when set up solidly.

The details described were of great interest, as showing the alterations needed to enable the Corliss engine to be driven at a very high piston speed.

Mr. Sterling said that he had never seen a Corliss engine running as fast as 160 turns, and was glad to hear that it could be done.

An interesting discussion took place in regard to high-speed engines and the performance of this one. In answer to questions it was stated that there was a little jar at first, but none can be perceived at present. Little difference can be seen, whether the engine is working fast or slow or just starting.

Prof. Thurston said that he had calculated the speeds at which engines of ordinary proportions of parts can be driven to run most smoothly, and had found that many of the ordinary engines had reciprocating parts of such weight as to work smoothly at rates of speed higher than those usually adopted by Mr. Porter, and he asked if the Porter-Allen engine is to be driven at these increased speeds whether the reciprocating parts will not be made much lighter. Mr. Richards answered that as these engines were built for higher speeds the parts were made light. At Johnstown the piston had not been lightened, the difference in the weight between the old and new piston being merely that due to the putting in of rings. Mr. Wheelock thought that in adopting high-speed engines we were going a step backward. Several gentlemen spoke of the great advantages of high-speed engines, and Mr. Richards said that he could run to 600 revolutions per minute. Mr. Leavitt excepted pumping engines, when by the necessities of the case the speed was limited. He then referred to a pair of Lawrence mill engines, 28 x 48 inches, which were working 106 revolutions per minute, working with 13 pounds back pressure. Mr. Hoadley, in response to a question, said that there was a pair of Buckeye engines on probation as auxiliary to 4 turbine water wheels. They are on the jack-shaft of the wheels, and in case of low water keep up the speed of the mill, sometimes developing 1000 horse-power, while at others they simply pass steam from the boilers to the dye-house through them. If it did not go through the engine it would go to the dye-house direct. They are using 45 pounds of steam per horse-power, with 15 pounds back pressure. There were many difficulties in the way of putting these engines in. The mill could not be stopped for experiment, so when they were ready they were speeded too high and then hitched on and run for a day. The present speed was obtained by gradually reducing the rate from day to day experimentally. He estimated that they cost about a ton of coal per day for 1000 horse-power. Performance had to be disregarded, regularity and efficiency being the important points. The water-wheels are liable to be clogged with leaves, a bushel being frequently taken from a single wheel. When the power of the wheels is diminished from this or any other cause, the engines must pick up the load and bring up the speed.

[*Note.*—Mr. Hoadley says, in a letter to the editor of the *Mechanical Engineer* concerning these engines, that the normal speed of the jack-shaft was 105, but its actual speed varied considerably, as usual. The speed with the engines coupled on is said to be 106. There is a centrifugal counter attached, which shows 105 to 106—about one revolution per minute below the actual, not being perfectly adjusted. The clock speed counter is in place, but not yet connected. Steam pressure varies within pretty wide limits, from 50 pounds or a little less up to 70 pounds, above the atmosphere, at which pressure the safety-valves are set. Back pressure also varies a good deal, between 8 and 13 pounds above the atmosphere. The 26 boilers at this main mill—all externally-fired return-tubular boilers, 60 inches, with 65 20-feet flues, 3½ inches outside diameter, grates 5 feet by 5 feet 2 inches—are all connected with the same steam-pipe. When producing 1000 horse-power, with 68 pounds boiler pressure and 12 pounds back pressure, the two engines transmit to the dye-house and print-works about two-thirds of the full supply of steam, the rest being drawn directly from the boilers. The engines were intended for 800 horse-power, with 70 pounds steam and 8 pounds back pressure, cutting off at about one-third of stroke. When running at 1000 horse-power, with 12 or 13 pounds back

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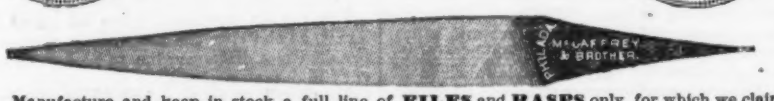

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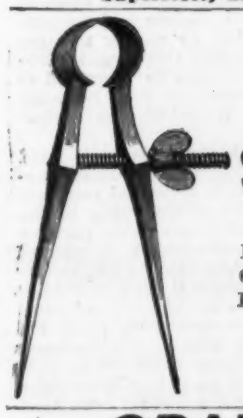

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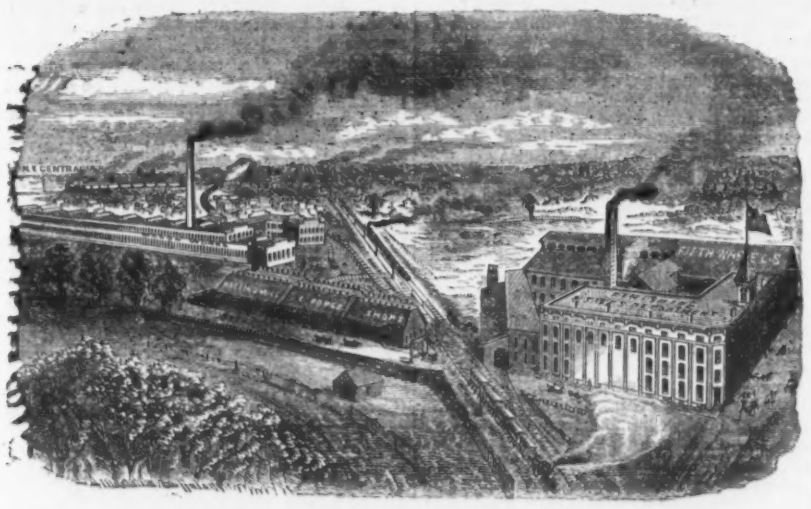

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Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,
Square Blunt,
Square Equaling Files,
Stave Saw,
Three-Square Files,
Three-Square Blunt Files,
Tumbler Files,
Union Cut,
Warding Files,
Warding Blunt File,
Warding Round Edge File.

RASPS.

Baker's,
Beveled Edge,
Bread,
Cabinet,
File, Flat and Half Round,
Flat Shoe,
Flat Wood,
Half-Round Shoe,
Half-Round Wood,
Horse, Plain and Tanged,
Horse Mouth,
Jig,
Oval or French Shoe,
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Butchers' Steels, Improved,
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File Brushes,
Machinists' Scrapers,
Stub Files & Holder, Detachable.
Surface File Holder,
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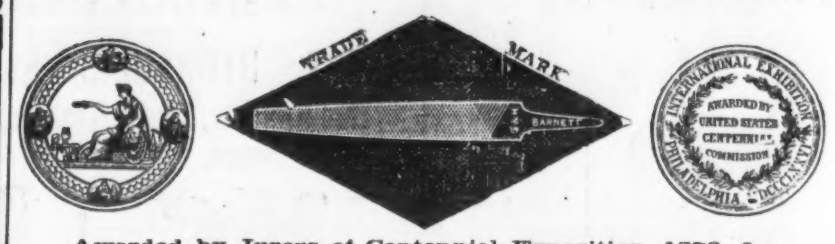
NICHOLSON FILE CO.,

PROVIDENCE,

R. I.,

SOLE MANUFACTURERS.

Black Diamond File Works.



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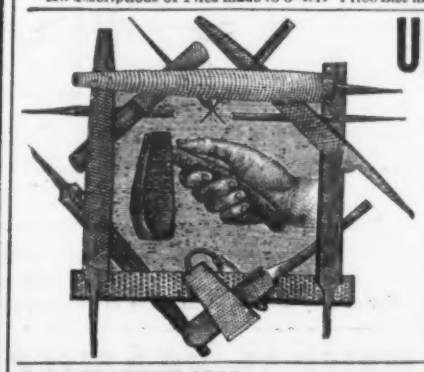
Warranted CAST STEEL. 187 Tenth Street, Williamsburgh, New York.
All descriptions of Files made to order. Price List mailed on application. Established 1863.



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Made from the Best Refined Cast Steel.

With all the requisite facilities to produce a first-class article, we are enabled to offer Files that will give entire satisfaction.

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ESTABLISHED 1842. **INCORPORATED 1881.**

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Manufacturers of the Celebrated

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New York Branch, 128 Chambers Street. WM. H. BRAMHALL, Manager.
Prices the lowest. Goods the best. Send for sample order.

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WATERFORD, N. Y.,

Manufacturers of the BUTTONS PATENT

"WIRE CUTTER AND PLIER COMBINED."

Specially Adapted for Use on Wire Fence.

Also Manufacturers of

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Price List on application. Established by DANIEL B. KING, 1829.

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ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use and all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER

Will roast 30 to 40 lbs. at once, and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Millbrook, N. Y.

Also sold by leading wholesale houses.

Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices

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THE WHITE MOUNTAIN FREEZER COMPANY are headquarters for Ice Cream Freezers and Ice Crushers, being the only firm in the United States who manufacture all parts of the raw material. The Examining Committee, consisting of 50,000 citizens of the United States have recommended the *Sands' Triple Motion White Mountain Freezer* to all persons in the world for the following reasons: We have used them; they freeze quicker than any other; they save time, salt and ice; the triple motion makes smooth cream without bunches; makes more of it; galvanized iron outside; tin inside; no zinc in contact with the cream; easily adjusted; substantially made; simple in construction; perfect in results. Send for descriptive circular and discount of this celebrated Freezer. Address,

HAND FREEZER. 2 to 25 qts. $3 50 to $25.00.
HAND OR POWER. 25 and 50 qts. $75.00 and $175.00.
HAND OR POWER ICE CRUSHER. $75.00.

White Mountain Freezer Co.,
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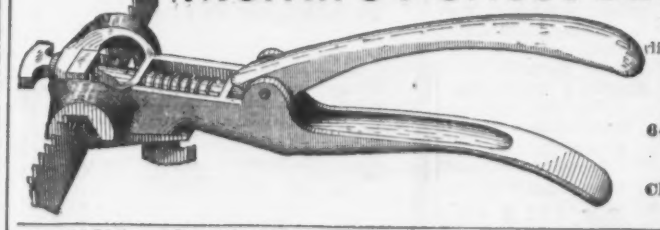

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GEO. M. SCOTT,

Bellows Manufacturer,

Johnson Street,

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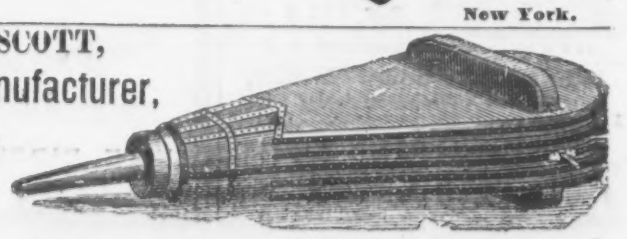
CHICAGO, ILL.



pressure, they fill about six-tenths of stroke and transmit about 46 pounds of steam per horse-power per hour to the print-works and dye-house, of course with only such diminution of heat as results from conversion of heat into work, and radiation from such extra length of pipes as its conveyance to the engines and thence to the dye-house requires—not a large loss. The engines so far fully equal my expectations, and I see no reason to apprehend any trouble from them. There are four turbine wheels, 6 feet diameter, 10-inch gates, connected with this jack-shaft, rated at 280 horse-power each. When I saw the engines on Tuesday, the 19th ult., both were running, developing 973 horse-power, with 68½ pounds boiler pressure, 13 pounds back pressure and 106 revolutions per minute. Two wheels were out of gear, a third wheel was running with closed gate, and the fourth was running with the gate raised 6 inches = 0.6 gate. It was a work of no little difficulty to adjust these engines so that they could be coupled to a shaft that must run regularly at working hours, and could never be run, experimentally, at any other time; but the difficulties proved in fact less formidable than I anticipated, and caused no trouble of any moment.]

Mr. Sterling: As we cannot drive our pumps above 100 feet per minute, which is too slow for steam, is it not possible, on pumps up to those discharging 1000 gallons per minute, to use gearing? In reply to this Mr. Nagle referred to pumping engines at Providence, where by such means a duty of 83,000,000 was obtained.

Mr. Holley gave notice of a motion to change the rule in regard to opening and counting of ballots for members. The amendment to rule on page 14 reads as follows: "The said blank envelopes shall be opened by the council at any meeting thereof, and the names of the candidates elected shall be announced at the meeting of the society first ensuing, and also in the first ensuing list of members."

The society upon Friday was occupied in visiting the various works of interest in the vicinity. A full account of these visits will be found elsewhere. The excursions, in spite of the rainy weather, were most delightful and instructive.

Friday Evening—Closing Session.

By special request of the society, Mr. George B. Bond, of the Pratt & Whitney Co., of Hartford, read a paper upon

STANDARD MEASUREMENT.

It gave an account of the steps that have been taken at that establishment to obtain a set of standards, together with an apparatus for comparing and transferring measurements.

The company some time since had a call from the Master Car Builders' Association for a standard set of taps, dies, &c., of the "United States" or "Franklin Institute" pattern. They wanted standard gauges. In attempting to fill this order some very unexpected facts were discovered, and it became for the moment a serious question as to how and where the standard lengths were to be obtained. Prof. Rogers was applied to, and the company began at the beginning and obtained copies of the British standards, which by law are the standards in this country.

The speaker gave a most interesting and valuable account of the British standards, the methods by which they were obtained and the difficulties encountered in the attempts to recover them from the pendulum vibrating seconds. After abandoning the attempt to recover the pendulum in this method, one of the copies of the lost standard was declared to be standard, and copies were made from this. Descriptions of the several standard bars were given, with some mention of the composition of the metal from which they were made.

The speaker then gave an account of the four copies of the standard yard which the Pratt & Whitney Company had obtained through Prof. Rogers, and which had been compared at Washington with the United States standards, which are also copies of the British originals. Some of the copies have both the yard and the meter graduations.

The instrument for comparing the length of bars with the graduations upon the standards, is called a comparator. It is rendered necessary by the fact that the graduations consist of ruled lines upon the surface of plugs let into the bars. In some cases the plugs are sunk deeply into the bar, and in others they are upon the surface. In either case the comparision cannot be made without the use of an instrument.

The comparator may be said to consist of four members—the bed upon which the standard bar shall rest, hardened steel guides, slides for carrying the microscope through which the divisions of the bar are to be observed, and, lastly, suitable stops which shall be equal to the distances read off by the microscopes. The microscopes are of 1-inch focus, made by the celebrated Tolles, of Boston. The slides, guide bars and other portions of the machine are adjusted by the most laborious and careful grinding, so as to secure horizontality, parallelism and freedom from deflection, even when loaded. This was accomplished by means of a high-power microscope and a mercury surface for a standard. The observations have been greatly facilitated by the use of one of Tolles' oblique illuminators, by which, with ordinary daylight, very small lines upon metal can easily be resolved. The necessity of this is apparent when we consider that the lines are about 1-15,000th of an inch in width. Without extensive diagrams it would be almost impossible to make the details clear. It is sufficient to say that every known precaution has been taken to make the work perfect.

The coefficients of expansion of the metals of the test bars have been most carefully measured, and it has been found that, when once the steel bars are obtained, trouble upon this score will be avoided, as these bars expand and contract uniformly with the work.

At the conclusion of the paper President Thurston said that Pratt and Whitney were deserving of commendation for this work, and believed it was the first time that such careful scientific measurements had been done in commercial work.

The question here came up whether the Pratt and Whitney standards corresponded with those of the Betts Machine Co.

In reply, Mr. Pratt said that they had gone on without regard to other people's divisions of the foot and the inch. When they first attempted to obtain a standard yard, they could not find that any of the measures obtainable would agree among themselves or with the supposed standards, and they were forced to go to the originals. The company are working for accuracy and accurate copies of government standards, regardless of what other people's standards are. Some $15,000 and three years of time had already been expended, and it is intended to go on until the system is completed. Definite results were hoped for within six months. In illustration of the difficulty of obtaining the standards, he said that when the company were applied to for standard thread gauges, they had a standard foot gauge made by one of the best makers in the United States. This was given to the Stevens Institute of Technology and to Prof. Rogers to test. These two authorities agreed, and decided that the rule was out a small, but still important, fraction of an inch.

Mr. Hoadley then read a paper upon the

SIEMENS PYROMETER, OR A MODIFIED FORM OF CALORIMETER.

One was needed in order to obtain exact measurements of the temperature of furnace gases far beyond the reach of the ordinary thermometer. Such an apparatus is described by D. K. Clark, but the author, after careful search, could not find such an instrument in the United States. Upon attempting to design an instrument of this kind, several questions arose.

1. The most advantageous quantity of water.
2. The best construction to prevent disturbance from external temperatures.
3. Best material for the vessel.
4. The substance for conveying heat to the water in the vessel.
5. Form, dimensions, weight, &c., of the substance selected.
6. Method of heating and transporting with least loss of heat.
7. Disposition and arrangement of the thermometers.
8. Details of manipulation.

The question of the quantity of water to be employed was decided in favor of two pounds instead of a pint, the quantity mentioned by Clark. Two pounds was much more convenient in the estimation of the temperatures to be measured.

A few calculations determined these points very conclusively. The two pounds of water included both the vessel and the agitator, which share almost instantaneously all the changes in temperature of the water. The calorific capacity of the vessel was ascertained, both by calculation and experiment, to be about 0.0534 pounds of water, requiring, therefore, 1.9466 pounds of water, making the whole 2.0000. Various vessels differ a little from each other.

In materials a variety of things had to be considered, but the choice finally fell upon sheet brass, which seemed to combine more advantages than any other metal which could be conveniently used. The metal used is .01 of an inch thick, and is sufficiently firm for the purpose. The surfaces are not only nickel-plated, but burnished so as to prevent corrosion and radiation. Silver on some accounts would be better than the nickel, but it could not have been used in connection with vulcanized rubber.

The instruments as a whole consist of several concentric vessels, the inner one of which contains the water, while the inclosed spaces are packed with eider-down, the external form somewhat resembling a large two-handled coffee pot with the spout wanting. The cup proper is insulated from the rest of the vessel by a body of hard rubber and the several shells of the case. The handle of the agitator and the rim and central tube of the cover are of the same material. The case is about 1¼ inches thick, and is composed of three concentric cups. This divides the internal space into three concentric chambers, with burnished nickel walls. The cover is made in a similar manner. The spaces are filled with eider-down, compressed no more than was needed to fill the spaces. This prevents radiation and the circulation of the inclosed air. Each space has a tube for the insertion of a thermometer. These are of use in the experiments made to determine the facts in regard to the conducting power of the vessels, &c.

The test experiments made to determine the calorific value of the vessel, so far as it is affected by the internal temperature, were of a very elaborate and exact character. These were given in great detail. The vessel and its parts were first brought to 69° F., then a quantity of water, weighing a little less than 2 pounds and having a temperature of 178° F., was poured into the cup, the cover closed and the agitator put in motion. In half a minute the thermometer reached its maximum of 175° F. and began to fall, slowly at first, and then rapidly. As attention could be spared the thermometers in the other compartments were noted. The heat was found to travel slowly outward. Observations of all the thermometers were taken regularly once each minute for the first half hour; after that once in 10 minutes. After four hours the changes were very moderate and regular, and the observations were made at longer intervals. Observations were continued through the night, the following day and the succeeding night. These were at last carefully plotted and curves of temperature obtained for each of the compartments, and interesting, though exceedingly small, correspondences noted between the rates of cooling and the variations in the temperature of the closet in which the apparatus was placed. The diagram of the loss of temperature in the central cup, referred to the temperatures in the middle compartment as a base line, was found to be very symmetrical. This was divided into intervals of five degrees, and the time corresponding to each was found. Then the time per degree and the loss per minute were calculated and the results carefully tabulated, so that corrections could be applied to any given set of observations under any conditions which might be encountered. This table was given in full in the paper.

The next consideration was that of the

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FRIEDMANN & LAUTERJUNG,

Manufacturers of

PEN AND POCKET CUTLERY,

Solid Steel Scissors, Shears, Razors, &c.

Sole proprietors of the renowned full concave

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And the celebrated **"ELECTRIC SHEARS."** Nickel Plated Bows.

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BUTCHERS' and HUNTERS' KNIVES

Are warranted to be equal in style, finish and quality, to any goods made in the world,

"COMPARE, THEN JUDGE."

We are the sole owners of the *Gardner Patent Guard and Rest for Carving Forks,* and the manufacture of fine carvers is with us a specialty.

AARON BURKINSHAW, Pepperell, Mass.,

Manufacturer of

PRUNING, BUDDING AND POCKET KNIVES

OF EVERY DESCRIPTION.

My Blades are forged by hand from the best cast steel and warranted. Established 1853.

AMERICAN MADE RAZORS

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MANUFACTURER OF

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In all Styles.

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"Hamburg Ring," "Bengall" Concaved,

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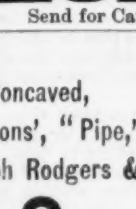

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Supplied with BLANK RAZOR BLADES for Concaving.

RAZOR HANDLES, RAZOR HONES, &c., &c.

Agents for BADGER'S RAZOR STROPS.

BRADFORD & ANTHONY, Boston, Mass.,

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American and Foreign Cutlery.

Hartford, Conn., April 23, 1881.

To all Dealers in Silver-plated Ware:

NOTICE AND CAUTION.

You are hereby notified that there are in the market the following infringements of our Trade-Marks:

1st. ROGERS & SON, ← GREENFIELD, MASS.

This was put upon the market by a concern known as Geo. W. Spurr & Co., of Greenfield, Mass., last year. We at once commenced suit against Geo. W. Spurr & Co., and our suit, begun in October last, is still pending. Almost immediately thereafter, Geo. W. Spurr & Co. began to be transformed into something else, and in February, 1881, a concern known as the Rogers & Spurr Manufacturing Co., claiming to be a corporation organized under the laws of Massachusetts, began at the same place the same piracy of our Trade-Marks. To protect ourselves and the public, we were obliged to bring a second suit against this *apparently new* concern. This we promptly did, and both our suits are now pending in the United States Circuit Court of Massachusetts, Messrs. Aiken & Son, of Greenfield, Mass, and Chamberlin & White, of Hartford, being our attorneys.

2nd. W^M ROGERS, ★

This trade-mark has been put upon the market by Simpson, Hall, Miller & Co., and we commenced suit against them last year, and our action is still pending in the Superior Court of this State.

As the delays of the law are numerous, and great damage is likely to be done to our trade before we can, by legal proceedings against the manufacturers, put a stop to these most apparent infringements of our long-established and well-known Trade-Marks, we take this way of *cautioning* you and all other dealers and purchasers of plated wares against buying any of the goods offered in the market bearing either of said trade-marks. *We also notify you that we shall hold you* ***personally*** *responsible to us for damages sustained by the sale of any goods by you bearing either of said marks, and that we shall take all legal measures possible to promptly and effectually stop all infringements of our well-known Trade-Marks.*

WM. ROGERS MANUFACTURING COMPANY.

FRANK WILLSON ROGERS, Secretary.

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GRASS, GRAIN & BUSH SCYTHES

Hay Knives & Corn Knives.

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See our advertisement in *The Iron Age* first issue of each month.

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GENERAL HARDWARE MERCHANTS,

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BALL'S PAT. SOLID STEEL SHEEP SHEARS.

These shears are unsurpassed for cheapness, durability and utility. They are made of one solid piece of steel from point to point, and cannot be broken in use either in the bow or at the junction of the shank and blade. Samples can be seen at above address, or sample lots furnished.

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COMMISSION MERCHANTS,

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Guns and Pocket Cutlery,

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Etc., Etc., Etc., Etc.

All sorts of Hardware and Merchandise for import and export purchased on commission.

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Kangaroo Sheep Shears,

The best Shears made.

Every Shears Guaranteed.

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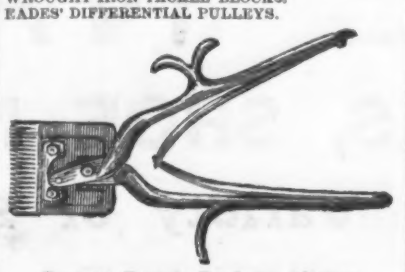
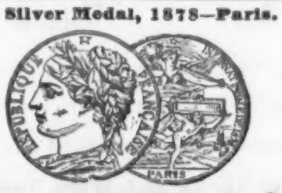


Peugeot Frere's Barber's Clipper.

Silver Medal, 1878—Paris.



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Cheapest House in the Trade.

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It having come to the knowledge of JOHN WILSON that Counterfeit Butchers' Knives, purporting to be of his manufacture, are being sold in the United States, he hereby cautions all purchasers of his Knives and Steels to be on the alert against such imposition.

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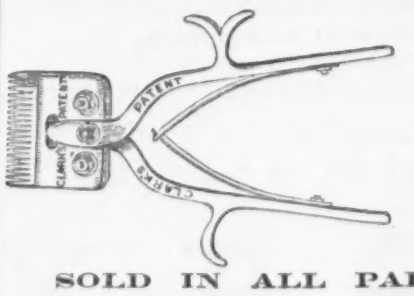
Every article of JOHN WILSON'S manufacture, bears the Trade Mark, in addition to the Name.

WORKS:—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750.



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No. 2,

for *Heads* and *Barbers' Use.* Has been before the public for many years, giving ***universal satisfaction.***

Warranted to Give a Clean Cut.

SOLD IN ALL PARTS OF AMERICA.

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This Machine has been so extensively used by the public for nearly ***12 years*** that comment is unnecessary.

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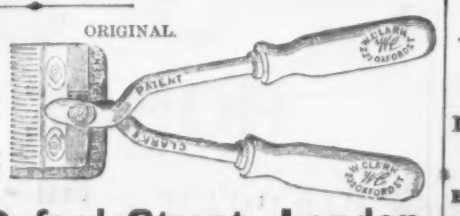

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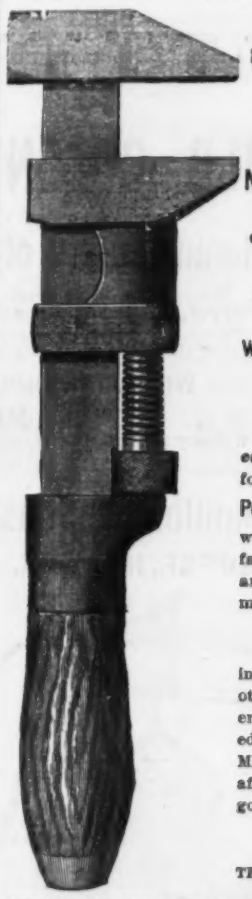

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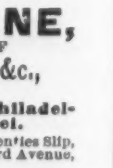

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substance to be used for conveying the heat from the furnace to the calorimeter. For the highest temperatures the choice seemed limited to platinum, as that metal alone had a sufficiently high melting point and specific heat pretty satisfactorily determined. Its high cost and very low specific heat were the objections to its use. It costs at the present time time $116.67 per pound avoirdupois, or $96 Troy. This is 1⅔ cents per grain, or 0.60 grains for a dollar. As scrap metal it sells for $5 per ounce—a discount of 37½ per cent.

The specific heat of the metal was somewhat uncertain. Some 35 determinations are given in Clark's "Constants of Nature," in which there are just enough discrepancies to make a selection of any one difficult. The nature of these was spoken of at some length, and the fact that they were very small in amount noted. Unable to investigate the conditions under which the determinations were made, they were all plotted on an enormous scale (1000 inches to unity, the specific heat of water), and a curve drawn to represent the probable mean. This curve was sensibly a straight line parallel to the base, showing that the specific heat of platinum appears to be constant at all temperatures up to about 2000° F., and to be one-thirtieth that of water. At this temperature the metal is far below its melting point, which is said to be in the neighborhood of 4000° F. It is probable that its specific heat will be sensibly constant even at 2500 F.—a property shared in an equal degree by no other known substance.

Unfortunately, the high cost and low-heat capacity almost unfit it for use. The speaker at last selected wrought iron as best suited for his purpose. At the high temperatures which the author expects to encounter, wrought iron will be plastic and difficult to handle; it would also oxidize so rapidly as to require frequent renewals, in the end making it little less costly than platinum. It was, therefore, resolved to coat wrought-iron balls with a firm capsule of platinum. The sizes and weights fixed were:

	Grains.
Iron, 0.88 inch diameter, weight	700
Platinum, 0.98 inch diameter, 0.05 inch thick, weighing	700
Total weight of iron and platinum	1,400

The probable specific heat of the wrought iron was arrived at in the same manner as that of platinum, but less satisfactorily, on account of the close proximity of its melting point. At from 2000° to 2500° F. it may be taken at, say, one-sixth that of water. It is probably even higher than this at the highest temperature, and at the melting point is probably quite large. Mr. Hoadley, therefore, proposes to determine the actual thermal value of the composite balls of platinum and iron by comparison with platinum heated in the same crucible, exposed to the same fire and cooled in calorimeters exactly alike in all respects, so far as it is possible to make them so. Great accuracy can probably be reached by exchanging vessels and making numerous comparisons, and accurate results may be expected even up to and beyond the melting point of the iron. The first approximation gives the following results:

0.1 pound iron, specific heat	0.166
0.1 pound platinum, specific heat	0.333
Combined value	0.200

which is 0.01 of the two pounds of water, including the equivalent of the metal of the vessel. The scale will, therefore, be 100 degrees to 1 degree; that is, each degree of heat acquired by the vessel will be equal to 100 degrees lost by the ball. Using two such balls, the scale becomes 50 to 1. If the specific heat of the iron needs correction, as is not unlikely, a corresponding correction can be made in the quantity of water, thus preserving the scale of 100 degrees to 1 for a single ball and 50 to 1 for two.

The method devised for using the apparatus is as follows: No. 1 black lead crucibles, with covers, are used for the heating. These have lugs for the purpose of convenient handling, and into them one, two or more balls are placed, say one composite and one platinum, or two composite and two platinum. A fire-brick, having a cavity in its upper side to hold the crucible, is placed on the bridge wall of the furnace, and is kept constantly at about the temperature of the fire at that point. A band around the brick with a suitable handle gives means for pulling it out or pushing it in through a door at the side of the boiler setting. Temperatures at the back end of the boiler are taken by means of a similar brick upon a shelf at a point just before the gases enter the flues. The crucible and its cover prevent the loss of heat by radiation during the transfer of the balls from the fire to the vessel.

The Farenheit thermometer was selected as, on the whole, most convenient. For the central cup the instrument is 12 inches long, graduated from 20 degrees to 120 degrees, giving about ⅛ inch to a degree. The thermometers used in the compartments are 6 inches long, and are similarly graduated. All of these have been very carefully tested and their errors noted.

Mr. Hoadley said he had hoped when the paper was begun to be able to present the results of an experimental trial of them, but the instruments were not completed in season. He hoped to present practical results at the next meeting. He also has in construction a large calorimeter for measuring the dryness of steam, which he expects to have completed shortly.

Prof. Thurston said that the method pointed out in this paper seems to be the only one practicable for high temperatures. It is, even with the crude apparatus ordinarily used, by far the most accurate.

The Rider engine, in which the volume of air is constant, becomes a very good thermometer. By experiments made by the students at the Stevens Institute of Technology, they succeeded in estimating the work done by both methods, and were able to obtain results which varied only 2 or 3 foot pounds.

In answer to a question regarding the degree of heat to be expected in boiler and other furnaces, Mr. Holley said Dr. Siemens claimed that his furnaces sometimes reached the heat of dissociation, and that he could see the air and gases passing through without mixture. The peculiar appearances of the gases at the highest temperatures changed as the heat was lowered, and from this it was argued that the heat was that of dissociation.

Mr. Hoadley exhibited a case containing a number of the balls which he intended to use in his pyrometer. Some of them were of platinum, others of copper and still others of one metal covered with a layer of some other metal—as iron covered with platinum.

Mr. Harrison then read a paper upon

THE FIRST ROLLING MILL IN AMERICA.

This mill was erected for Peter Oliver, one of the Crown Judges, at Middleboro, Mass., in 1751. Political influence enabled Judge Oliver to obtain a grant to import and erect a rolling mill in the colonies at a time when the manufacture of iron in any of the colonies was prohibited by law. The mill had some very peculiar features. It was driven by a pair of undershot water wheels, each one of which drove a bottom roll, while the top roll was driven by gearing from the shaft of the opposite wheel. These wheels were 18 feet in diameter and 10 feet face. The shears were driven by a long lever made by a cog on one of the water-wheel shafts. The rolls were tightened by driving long keys at the tops of the columns. The rolls were 36 x 15 inches, with chilled ends. The necks were 9 inches in diameter. The iron was reduced in four passes from ¾ x 3 inches to ⅛ x 3 inches. Judge Oliver worked the mill until 1776, when he suddenly went on board of an English man-of-war, and sailed for England. The mill passed into other hands and was worked until 1830, when it was abandoned.

In 1818 the mill was worked with about eight men at about $1 per day. Eight hundred pounds of iron was made in 12 hours mining, and one pint of rum was used for each heat, according to the weather.

When Jesse Reed brought out his nail cutting machine in 1818 the old business of making nail rods was abandoned, except for horse-shoe nails, but the old mill was kept at work making flat plates for the nail machine.

At the close of the paper a gentleman handed about the room several hand-made nails, which were said to have been made from iron rolled at the old mill.

In answer to questions, Mr. Harrison said that there were no box grooves—plain offset only. The passes were 4 inches wide. There was plenty of bearing without turning a fin over the edge. The 10-inch chills were used for the plates after plate rolling was begun. There was no edging.

Mr. Sterling: It is interesting to note the contrast between this and modern mills, but we haven't improved in the quantity of rum consumed per shift.

Mr. Moore then presented the following:

Resolved, That the thanks of this society are due, and are hereby tendered to his honor the Mayor, and to the Board of Aldermen and the Common Council of Hartford, for the use of the meeting and committee rooms; the manufacturers of the city and vicinity for courtesies extended, and also to the local committee. (Resolution adopted.)

Mr. Melvin read a paper on

AN IMPROVED MERCURY COLUMN OR PRESSURE GAUGE.

The unreliable nature of spring gauges of all kinds is well known. The mercury column is often used as a check upon the gauge, though inconvenient and limited in range.

The author wished to show that the mercury column may be brought into general use at a small cost as a standard test gauge, without the necessity of erecting high and unwieldy syphons. Instead of these single syphons, several are employed, which are connected in the manner described in "Weisbach's Mechanics." To get rid of the effects of expansion, the scale is used from the difference of level instead of from a fixed point. A diagram upon the blackboard showed a syphon of five syphons. These are arranged in pairs, side by side, so as to occupy only a small floor space. Holes in each syphon are made at the mercury level, for the purpose of filling the upper portions of the tubes with some liquid of known specific gravity. When the tubes have been filled all these holes are plugged.

When in use the first mercury column is depressed a certain amount and the pressure transmitted to the next column.

If the second liquid was without weight the hight of a single mercury column would be equal to the sum of the differences of the mercury columns, but the sum of the differences is too great by the amount of the weight of the second column, and this amount must be deducted. The formula stands:

$$p = n\,d\left(1 - \frac{1}{13.59}\right)$$

when p = the pressure, n the number of syphons and d the difference of level, 13.596 is the specific gravity of mercury. Water is used as the second liquid, hence unity is the numerator of the fraction. If any other liquid is used the specific gravity must be substituted in the numerator.

The correction for temperature depends on the relative densities of the two liquids, as well as on the actual expansion of the mercury. By selecting the second liquid so that the relative densities of the two liquids remain the same at all temperatures, the correction is the same as that of a mercury column of the same hight. If the ratio of the densities of the two liquids increases with every movement of temperature, the differences of level between the surfaces of the mercury will be the same, regardless of variations of temperature.

Several liquids have been used. If tetrachloride of tin is used its density decreases rather faster than that of mercury, hence the column actually shortens as the temperature rises. Water and glycerine have been satisfactorily used as a second liquid in a five-syphon gauge which has been in use for the last four years.

The following table shows the variation in a 30 inch column on a five syphon gauge where water and tetrachloride of tin are the second liquids.

Temperature.		Hight of Column.	
Cent.	Fah.	Water, as 2d liquid.	Tetrachloride of tin, 2d liquid.
0°	32°	30.00000	30.00000
10°	50°	30.05420	29.99657
20°	68°	30.11050	29.99337
30°	86°	30.16050	29.99010
40°	104°	30.21405	29.98642

The specific gravities of the mercury and

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Cts.	26	23	21	20	19	18

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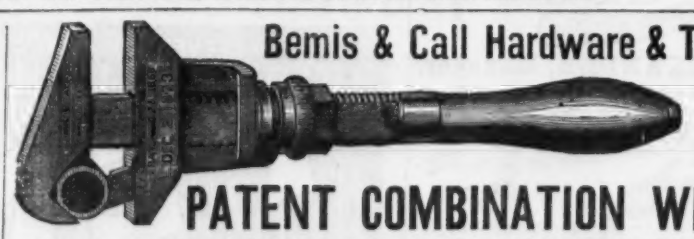

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the chloride of tin vary, as shown in the following table:

Temperature.		Specific Gravities.		Differences.	
Cent.	Fah.	Mercury.	Chloride of tin.	Mercury.	Chloride of tin.
0°	32°	13.59600	2.2671	.0244	.0256
10°	50°	13.57167	2.2415	.0243	.0255
20°	68°	13.54736	2.2160	.0233	.0254
30°	86°	13.52405	2.1906	.0251	.0258
40°	104°	13.49895	2.1648	.....	.....

Alluding to the great need of an instrument for the accurate indication of high pressures, the speaker said that this form of monometer is capable of giving accurate results, without being cumbersome in size. For pressures corresponding to 500 atmospheres, which would call for a mercurial column of 1250 feet, an instrument could be constructed with 100 15-foot syphons, which would easily test up to this pressure. This would enable us to do away with the somewhat indefinite method of computing high pressures in atmospheres.

Mr. Oberlin Smith read a paper upon

EXPERIMENTAL MECHANICS,

in which he called attention to the difficulty of obtaining practical data upon a great variety of subjects, without resorting to long and costly methods of experiment. He spoke of the advantages which would accrue if some central mechanical laboratory could be established for the purpose of making experiments, obtaining data and putting it into the shape that is needed by the profession.

Some very interesting cases which have arisen in his own experience were cited, as also the efforts which he had made to obtain information upon the points raised.

The discussion, which was of great interest, was opened by Prof. Thurston, who said that the subject was one well worthy of consideration. When people see what has been done by Messrs. Pratt & Whitney, they will see how much a bureau of this kind is needed, and how valuable it would be to all. It is, of course, not a novel proposal. This plan has taken very promising shapes sometimes, and there appeared to be reason to hope that such a scheme would come into successful operation.

The government has done some experimenting which is of the greatest value. The reports on the Franklin Institute experiments on iron and upon boiler explosions, made at government expense, have been published (1836) and the volume is of great value. Another set of experiments, by Prof. Johnson, on coals (1844) was published in a public document, and, though made some time ago, are still regarded as authority.

An attempt was made by the government to investigate the causes of boiler explosions (1873), and $100,000 were appropriated for the purpose. The President, who had the appointment of the commission, did not know who were competent to take charge of such an investigation, and the Treasury Department bureau having supervision of steamboats took the matter up. The results reported were small and the work is incomplete. No complete report was made. The reasons for this state of the investigation were stated, and Prof. Thurston said it was not likely that in this generation, at least, the subject would be taken up again by the government. The Hartford Steam Boiler Inspection and Insurance Company and other similar organizations are getting information together, and are doing this even more easily and better than the government could. Judging from the facts gathered by them, we may say explosions can usually be classed under three heads: 1. Ignorance. 2. Carelessness. 3. Utter recklessness. The remainder of the explosions which do not come under one of these three heads amount to only 3 or 4 per cent. of the whole. The most of the causes are well known, and are simple and easily preventable. There may be a few that are not known.

The Civil Engineers' Society took up the subject of getting the government to make tests of iron and steel. They were, after great labor and much time had been expended, at last successful, and a board was appointed and an appropriation made of $75,000. The board had $15,000, and $60,000 was to be expended in the construction of a testing machine. They contracted for a machine to cost $31,500, and, while the machine was in course of construction, they began and carried out a series of subsidiary investigations. They reported in 1878; the public document containing the report will be republished during the coming summer. In the year following the one in which the appropriation was first given, the amount appropriated was smaller, and, after that, Congress declined to make any further appropriations of public money, and the board ceased to exist in consequence. The machine, which was just finished when Congress refused to aid the work any further, fell into the hands of the Ordnance Department, which is doing good work with it. The influence which was brought to bear upon Congress to devote a further sum of money toward making the tests was enormous, and in any other interest would have been ample to secure any desired end, but for this purpose seemed utterly without effect.

Some years ago several gentlemen connected with railroad work applied to Prof. Thurston at the Stevens Institute of Technology, and asked whether the institute could not take up in a small way some of these much-needed investigations. Upon examination and consultation of all interested, the reply was that it could be done if the necessary capital was only forthcoming. The matter was at last focussed and called the Mechanical Laboratory of Stevens Institute of Technology. During the time Prof. Thurston was serving upon the government board he did a considerable amount of work with the machinery of the laboratory. This was, in fact, the starting point of the laboratory, at that time the professor having succeeded in getting together a considerable amount of apparatus of various kinds. In various ways some $40,000 worth of work has been done. Soon after this Prof. Thurston's health broke down, and the work lagged, little being done for some time. At present there is a considerable amount of commercial work, but this does not lead in the direction that Mr. Smith has indicated. Those who have experiments made do not wish usually to have them published. Capital is needed for carrying out such a plan as would be necessary to meet Mr. Smith's requirements.

Mr. Holley said: I think I ought to call attention to one fact—the apparent indisposition of the Ordnance Department of the United States army to co-operate with civil engineers in the manner proposed by the American Society of Civil Engineers, viz., to have a mixed board of army, navy and civilian engineers. If the only way the constructing engineers of America can get the benefit of the public money that is to be spent in ascertaining the value of the modern constructive materials—if, for instance, the knowledge of the mild steels as applied in boilers, bridges and machines where life and unmeasured property are at stake—if this knowledge can only come down to ordinary constructors through the Ordnance Department of the United States army—then I beg the members of the Society of Mechanical Engineers not to waste any time in fighting the inevitable, but to stimulate the Ordnance Department by all means in their power to carry out with their excellent testing machine such experiments as will benefit the general public, rather than those experiments which only refer to ordnance and ordnance materials.

Prof. Thurston said the machine has done, and is doing, good work. It is open to the public and is in constant use by business men. Nothing has, therefore, been lost in building it, and the results obtained by private parties are gratifying all round.

Mr. Sterling called attention to the immense amount of information to be obtained upon all practical subjects from a published German work.

Prof. Thurston then alluded to the fact that this work was first issued as "Kerl's Reportorium," but now published as "Schubarth's." It contains a list of what has been published upon mechanical subjects and is of immense value. The *Journal of the Franklin Institute* contains lists of what is being done in this country, and he referred to publications and articles issued in other countries of similar value, as the *Annales de Chimie et de Physique* the German *Annalen* and others.

Mr. Hartwell read a paper upon "A Condenser and Apparatus for Purifying Exhaust Steam from Oil." The principle of operation is to take the exhaust into a chamber of many times greater area than that of the exhaust pipe. The exhaust enters from above and the tendency for any particles of oil in the steam is to continue their course until they strike upon a bed of stone chips confined in place by a wire screen. The steam meantime turns at right angles and slowly passes onward through several screens of wire gauge. Its motion, however, is slow, as the chamber is from 12 to 50 times as large in section as the exhaust pipe. In this chamber a proper grease overflow is provided. The grease has a great tendency to adhere to any solid bodies in its course, and by means of the screens and body of stone chips the oil is taken from the steam, leaving the latter free to rise upward and enter the condenser, which is placed directly over the oil trap. This is arranged so as to heat the water nearly to the boiling point, but without back pressure upon the engine.

At the conclusion of the paper, Mr. Sterling brought up the question of printing the papers and distributing them to members before the meetings, so that they could have an opportunity to consider them carefully before discussion. While the desirableness of this was shown, it was not deemed best to have a hard-and-fast rule, for the members are busy men, and it frequently happens that they are not able to prepare papers a long time in advance. Matters of current interest also may come up which it is desirable to present at once. Some miscellaneous discussion of topics which had been previously presented here followed, the substance of which has been given in connection with the various subjects mentioned.

The Society then adjourned.

At the Physical Society of London, Prof. J. H. Gladstone exhibited recently an interesting experiment showing the crystallization of a metal upon itself from a fused salt. Dr. Gladstone and Mr. Alfred Tribe, in the course of some experiments on metallic replacements, observed that some sheet silver placed in fused silver chloride became quickly studded with crystals of the metal. The displacement of a metal by itself seemed so anomalous that they at first supposed the silver employed to contain impurities; but such was not the case, and they further found iodide of silver could be substituted for the chloride with a like result. Moreover, when copper was immersed in fused cupreous chloride, zinc in melted zinc chloride, or iron in fused ferrous chloride, crystals of each of the several metals separated out. That this phenomenon was not due to a different physical condition of the rolled metals was proved by putting crystals of the pure metal, separated by electrolysis, instead of the rolled metal, when fresh crystals were formed as before. Subsequent experiments went to prove that the effect is really due to an electric current set up in the cell by the unequal heating of different parts of the metal plunged in the salt. This contact current was proved to exist by means of a galvanometer, and the two following experiments intensified the electrolysis. Some silver chloride was fused in a hard glass tube and a rod of silver placed in it. On heating the underside of the lower end for ten minutes, a considerable crop of silver crystals was found in the cooler part of the liquid. Again, some silver chloride was fused in a crucible and one side more strongly heated than the other. Two rods of silver were connected together, and one in the hotter the other in the colder part of the salt. At the end of 15 minutes the latter was found studded with crystals, while the former was clean. Copper wires immersed in cupreous chloride gave a similar result.

Preparations are making by the Amalgamated Association of Iron and Steel Workers, to hold its second annual reunion at Beaver, Pa., on Saturday, June 4th.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, May 26, 1881.

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RATES OF ADVERTISING.
One square (12 lines, one inch), one insertion, $2.50; one month, $7.50; three months, $15.00; six months, $25.00; one year, $40.00; payable in advance.

DAVID WILLIAMS, Publisher,
83 Reade Street, New York.
PHILADELPHIA.....320 South Fourth Street
THOS. HOBSON, Manager.
PITTSBURGH.....77 Fourth Avenue
JOS. D. WEEKS, Manager and Associate Editor.
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CONTENTS.

The British Board of Trade returns for April give evidence of the unsatisfactory state of affairs in the English iron trade. It is true a reduction of the figures showing the shipments to other countries was anticipated, and therefore they do not give rise to much disappointment. Still, the falling off, compared with the deliveries during the same month last year, is considerable. The quantity of iron and steel exported last month was 329,100 tons, worth $11,290,000, against 444,991 tons, worth $15,470,000, in April, 1880. The United States naturally have fallen back most, but it must be noted that other countries, too, have not bought as liberally as they did a year ago. During April the shipments to this country were 43,388 tons of pig iron, 1150 tons of bar and angle iron, 38,753 tons of railroad iron and steel of all sorts, 4757 tons of hoops, sheets, &c., 7473 tons of old iron and 7517 tons of unwrought steel. In view of the condition of our own markets, these quantities still appear to be excessive—notably the items of pig, bar and angle iron and unwrought steel. The large quantity of hoops and sheets is the natural result of the Treasury decisions, and there seems no prospect of an early check to the movement. But so far as the other articles just enumerated are concerned, we are unable to escape the conclusion that such shipments are only calculated to do injury to the trade here, without effecting any relief to England, or holding out a promise of success to those engaged in the importations.

What are the Facts About Iron?

The attitude of expectancy in which all connected with or interested in the iron trades seem to stand at the present time, shows how little, even in these days of ocean cables, land telegraphs, hourly mails, newspaper enterprise and intimate international commercial intercourse, manufacturers and merchants are willing to trouble themselves about the causes not obviously or immediately operative, or not visible at a glance. Every day we hear or read confident predictions of something better in the immediate future. Those who, from temperament or business interest, incline to optimism, have no end of good arguments with which to fortify their failing confidence. They point to the crowded workshops of the country, to the admitted enormous consumption, and to the fact that, great as the consumption is, the want is not yet supplied, for the reason that orders for manufactures of iron in various forms—machinery, railway equipment and rolling stock, tools, &c.—are going begging. How can depression in the iron market, with a steady decline in prices, continue under these conditions? Obviously, there must be an improvement within a few weeks. Large consumers are known to be lightly supplied and depending upon current purchases from week to week. A little increase in the demand would alarm these cautious buyers, and they would be eager for all the iron they can get at present or even higher prices. Our surplus stocks of pig would disappear so quickly that no one could tell where they had gone, and, before we knew it, we should be in exactly the position for another "boom." To what extent consumers share this confidence it would be difficult to say. But, for the present, they evidently consider it expedient to be cautious and not to help the "boom," until they have better evidence of an advance than is furnished by the predictions of those whose business it is to sell iron.

A careful examination of such facts respecting the actual condition of the world's iron markets as can be gathered from trustworthy and accessible sources, leads inevitably to the conclusion that, under existing conditions, it is a mistaken policy to try to bolster up iron. It cannot be done, and the effort would only complicate the evil and postpone a return to a healthful and stable condition of business. The sooner we recognize the fact of a heavy overproduction of iron the sooner will production be curtailed, and until this is done things must inevitably go from bad to worse. Now, what are the facts? From statements contained in the recent letters of our able English correspondent, it is evident that the effects of a long period of overproduction are now beginning to be felt. The weaker districts are commencing to give way under the tremendous competition of Scotland and the North of England, both of which are forcing their pig on every market, and in spite of repeated concessions the stocks are accumulating at an alarming rate. The period of hesitation as to whether it is best to stop work or continue has already been reached in England, and the conviction is steadily gaining ground that there is no early prospect of a remunerative business for the large number of producers who were tempted into resuming work in their idle mills and furnaces by the high prices of the "boom" period. For many months they have struggled against adverse circumstances, aggravating the situation and prolonging its duration. It makes little difference whether the English iron surplus is here or there; whether it is good iron or bad. Agents in this market are eager to sell it to American consumers, and are to a large extent succeeding. If any of this iron comes to the United States the buyer will not waste it. Whatever its quality, a ton of iron is a ton of iron, and, whether good or bad, it takes the place of a ton of American iron for some use. The continued importation of Scotch and English iron into this country, means simply that the loss attending its sale here is less than the cost of carrying it in stock at home. We refer our readers to our English correspondence for a great deal of valuble and accurate information respecting the condition of the British iron markets.

In all but one of the iron-producing countries of the Continent, matters have gone from bad to worse for several months past. The good times of the close of 1879 lasted into 1880, and then the markets receded rapidly into their former condition. In Germany, American orders kept up a show of activity for a considerable period, but their discontinuance brought about a rapid decline in prices. There was nothing in the home trade to warrant the rapid rise, nor did the short-lived "boom" create any sustained legitimate demand. Taken as a whole, Germany did not prosper during 1880, nor is the outlook at the present time at all encouraging. Notwithstanding this, the production of pig iron advanced from 1,965,000 to 2,230,000 tons during 1880—the highest figure ever reached. A number of circumstances, however, tend to weaken the effect of this apparently rapid growth of home production. The enforcement of the new tariff since the middle of 1879 has naturally tended to check importations to some extent by transforming the business to German producers, and, in fact, we find that the excess of imports over exports of pig declined from 155,000 tons in 1879 to 127,000 tons in 1880. The exports of manufactures of iron and steel, notably of rails, tires, &c., were considerably increased during 1880. This, however, will not account for an increase of 265,000 tons in production, especially if it is considered that the first effect of the rapid rise of prices was to clear away stocks, and that by the time production had responded to the impulse, the movement was dying away. The effect has apparently been to replenish and increase the stocks; and without any present prospects of a revival growing out of improved conditions at home, the outlook for the German trade is gloomy, especially as the English trade now virtually controls prices, notwithstanding the low duties which were intended to protect German producers.

Belgium, which has always been more an iron-working than an iron-producing country, has been forced to follow the fortunes of her neighbors very closely. But although working more cheaply than those of almost any other district of Europe, the Belgians have found it a hard matter to buy foreign pig and compete with the English in their own markets. In Austria-Hungary, home consumption fell off rapidly when high prices were ruling, and it has not since rallied sufficiently to counterbalance the gain in production then induced. Trade, therefore, is dragging, and the prospects are by no means bright, as there is little hope of getting rid of the surplus in foreign markets in the face of the powerful competition of England, Belgium and Germany.

The only country that has been enjoying fair prosperity, and will in the coming year, in all likelihood, continue to enjoy a brisk demand for iron and steel at good prices, is France. The enormous expenditures of the government for internal improvements and the inducements it offers to local enterprise, are telling on the iron and allied trades, to which the benefits are reasonably secure by the operation of the tariff. There is nothing alarming, therefore, in the expansion of the production of France during the past year, although the increase has been quite exceptional. It should not be forgotten, however, that this is not likely to appreciably affect the state of the trade in general, as the French have it pretty much to themselves, and as their withdrawal from competition in foreign markets, insignificant as it was, does not make any great difference.

In the following table we have compiled the production of pig of all the principal countries of the world in 1879 and 1880, the figures given being in net tons.

	1879.	1880.
Great Britain	7,147,000	8,649,000
United States	3,071,000	4,295,000
Germany	1,965,000	2,230,000
France	1,388,000	1,733,000*
Belgium	448,000	600,000*
Austria-Hungary	412,000	500,000*
Total	14,431,000	18,007,000

* Estimated by local authorities.

This growth is well calculated to make even the most sanguine reflect. It is true the bare figures are likely to give a somewhat erroneous idea of the facts. We have noted that the increase in the case of France, and to some extent in the case of Germany, is due to a legitimate and healthy condition of affairs, which, in one instance, still continues. It may also be urged that the expansion of production is due to an increase in the demand, and it is natural to point at once to the growth of the steel trade, which was brought about by an extension of the steel rail business. Unfortunately, we do not possess as yet full statistics of that important branch of the trade in all countries. The following figures, all net tons, are accessible thus far:

	1879.	1880.
Great Britain	382,659	828,699
United States	683,964	954,460
Austria	77,370	68,807
France	203,742	279,847
Total	1,527,735	2,131,813

By the construction of many new lines and the prosperity of old ones, the expansion of our own steel trade is legitimate, and this is true to a certain extent also of Great Britain, and entirely so of France. Let us assume that this increase of 1880 over 1879 in the production of steel rails, is swelled to 750,000 tons by the growth of the trade in Germany and Belgium, and still this would not account, taking the waste at its highest limit, for as much as 1,000,000 tons of pig. There remains a surplus of 2,600,000 tons. After making a fair allowance for the greater quantities required in such industries as shipbuilding, which has taken a very favorable turn during the year, and taking into consideration such extraordinary sources of demand as the Grecian armament and the shipments to this country, we have 2,000,000 tons of pig iron to account for by the growth of the ordinary consumption. In view of the fact that shortly preceding and during this period, almost every remote corner of the world was emptied of its stores of scrap iron, it is hard to believe that more than 1,000,000 tons actually went into consumption, leaving 1,000,000 tons to be added to the stock. This, as nearly as we can calculate it, is about the extent of the present overproduction of pig iron in all countries. It is, we think, likely to be an underestimate, rather than an overestimate.

In this country the condition of the iron trade is seemingly anomalous, but when we look closely we find that it is easily accounted for. The stock of pig iron in the United States at the beginning of 1880 was 141,674 tons. On the 1st of January, 1881, it was increased to 456,658 tons. On the same date the stock of pig iron in Great Britain was 1,541,411 tons—together, 2,000,000 tons. According to Mr. Swank's statistics of last year's production and our own quarterly returns of the condition of the blast furnaces of the United States, the general average production of charcoal furnaces is 4200 tons, of anthracite 11,000 tons, and of furnaces using bituminous coal 13,000 tons. Taking these figures as a basis for calculation, we estimate the production to June 1 at 266,000 tons for the charcoal furnaces, 731,000 for the anthracite and 833,000 tons for the furnaces using bituminous fuel, a total of 1,830,000 net tons, or at the rate of 4,392,000 tons per annum. Just what our annual rate of overproduction is we cannot say; but supposing that it is only a few hundred thousand tons, this estimate does not help the matter any. It is true that a speculative spurt or a scare among consumers would relieve the market temporarily; but what would this benefit us? The consumption of the country cannot be increased under any circumstances in a less time than from 12 to 18 months. The manufacturing capacity of the country is taxed to its limit, and every piece of machinery used in shaping or working iron is driven to the breaking point. This capacity cannot be extended. We know of a manufacturer of iron who lately wanted to add a machine shop to his works. He sent an agent around to buy the plant, and found that the average time demanded by manufacturers willing to book his orders at all, was nine months for small tools and from eighteen months to two years on such heavy pieces as large lathes and planers. We cannot place an order for a locomotive to be built under a year, for a cupola to be erected within six months, or for tools to work iron except at the convenience of manufacturers who are now months behind their orders. This means simply that we have reached our maximum consumption; and if with such a consumption we are still piling up iron at furnaces and witnessing a steady decline in prices, he must be an optimist indeed who can see any relief for the iron trade except through a reduced production.

This, to use a familiar expression, is "just where the shoe pinches." Everybody in the business would like to see everybody else blow out his furnace or close his mill; but for himself, he prefers to hold on a little longer and take the chance of some miraculous turn for the better. In the case of stock companies, this unwillingness to follow the dictates of sound business judgment is natural, as it means dissatisfaction among stockholders and loss of position and salary to officers. In the case of private individuals and limited partnerships, it is also natural, perhaps, as most people would rather hold on as long as possible, than incur the certain losses attending an indefinite suspension of business. But the inevitable alternative must be met sooner or later, and the iron trade cannot regain a sound basis except by a suspension of production wherever production does not pay. Such a contraction is needed for another reason. Labor is now getting, on the average, at least 30 per cent. more wages than employers in the iron trade can afford to pay. Skilled labor in rolling mills is now earning about 40 per cent. more than it ever earned, so far as we can learn, when bar iron was selling at 2.5 cents and under; unskilled labor about 25 per cent. No reduction is possible in view of the admitted scarcity of labor which now exists, and which must continue until production is materially curtailed.

These are unpleasant facts, but we state them in good faith. If they are facts, it would be folly to conceal them, and an attempt, under the circumstances, to avert what seems to be the inevitable downward tendency of prices, would be as futile as an effort to stay Niagara with a spoon. Unless some unforeseen and wholly improbable contingency changes the whole position, we must reach a condition in which recovery is possible only by a return to something very like the situation in 1877.

The British Iron Trade Association—a body organized only five years since—appears to be doing very efficient work in the cause of the English iron trade under the guidance of its present managers. From a recent report it appears that it is urging the government to secure favorable consideration of its interests in the treaty negotiations with France and Spain, and is rapidly becoming the recognized representative body of the trade. Its policy is eminently aggressive, both in matters relating to home and foreign policy, and it is not likely, therefore, that the association will be content to let affairs here take their own course. We may look for increasing efforts on the part of this association to further English interests in this country directly or indirectly. The representatives of the American iron trade will therefore do well to watch its movements closely.

The Meeting of the Mechanical Engineers.

From the manufacturers' standpoint the recent meeting of the American Society of Mechanical Engineers at Hartford is an event of great importance. It was the first of the regular quarterly meetings of this new society, and showed in a striking way the material of which it is composed, the work it intends to do, and the ability which it has for carrying out what it has undertaken. Few men are more important to the manufacturer than the mechanical engineer. He stands at the head of the shops, and his eye and judgment are usually the only barriers against wastefulness in thousands of unknown channels. From his knowledge and judgment are to be obtained economies which make many processes, otherwise ruinous, not only practicable, but profitable.

At the Hartford meeting there were few papers read which did not deserve unusual attention. The opening paper by Prof. Thurston, and that which followed by Messrs. Denton and Wolff, were of peculiar significance. Both aimed at the solution of one and the same problem, though attacking it from different points. The question is, How shall power be obtained with the steam engine at the least cost? The object of the discussion was not to develop theories of expansion, regardless of their applicability in practice, nor to take up the mathematical investigation of the abstruse matters connected with the use of steam, but to concentrate our knowledge of this one problem in such a way as to enable the inquirer to solve the commercial question of furnishing 5, 50 or 500 horse-power by the week, month or year for the least money. The investigators have undertaken to consider every item which goes to make up the expense of power, from the cost of engine and of coal to the engineer's wages and the rent of the engine-room. With varying conditions, the items have varying effects upon the results, and that which might be worth serious consideration in New York need not be mentioned in Nevada, while vital questions there become insignificant on the seaboard. The theoretical investigations show that even the most economical points of cut-off, the speed of the engine and its proportions, may be determined as much by what would be termed the commercial aspects of the problem as by purely theoretical reasons.

In the discussion of the papers which we have mentioned, Mr. E. D. Leavitt, Jr., who has built some of the most economical engines ever constructed, speaking of the commercial side of the problem, remarked that he often met cases in which the saving made by high economy would not pay for the cost of obtaining it. There are frequent cases of small water works where a common steam pump is actually cheaper than the finest engine that could be built. It can be shown that there is probably no place in the country where a Cornish engine could be put at work and be a commercial success. Yet the Cornish engine works with extreme economy.

The discussion of belting, though highly scientific, was equally practical in its character, and was equally important. Mr. Nagle's paper aimed to get at a mathematical formula which should be at once strictly scientific and at the same time applicable, with accuracy under all the numberless variations found in actual practice. When we consider that probably nine-tenths of all the power developed in the country is transmitted by belts, we can easily see the immense importance of being able to calculate exactly the work which ought to be performed by any given belt under any given set of conditions.

In Mr. Hewitt's paper on the continuous rod mill of the Trenton Iron Company, we have the particulars of a case where the speed of a large Corliss engine has been brought up to a point never before attained, we believe, with an engine of this class. High speed means smaller engines, more power for less plant, and, of course, a less interest account. The circumstances, it is true, are exceptional, but the engine's performance shows that even a Corliss may be driven at the highest rates of piston speed without excessive wear and tear, and that these engines, often supposed by manufacturers to be suitable for use only where a gilt edged engine room is possible, can be set up in a rolling mill and work for years with regularity.

In one of the discussions Mr. Hoadley mentioned a case which was particularly interesting to engineers, but which was likely to be overlooked entirely by mill owners and manufacturers generally, and yet possesses for them an equal interest. A pair of engines were put in for the purpose of keeping up the speed of a mill driven by four water wheels. Owing to obstructions, &c., the wheels frequently fall off in their duty, in which case the engines pick up their load and keep the speed steady. The exhaust steam from these engines is used in the dye-house, and for this purpose is kept up to a pressure of 13 pounds per square inch. The dye-house requires a large quantity of steam at a low pressure, and if the engines use it the only cost which they incur for fuel is that required to raise the steam from 13 to 45 pounds, and to provide for the losses by radiation and condensation in passing through the engines and steam

pipes. It is estimated by Mr. Hoadley that the engines, though at times passing 45 pounds of steam through them for each horse-power, actually develop 1000 horse-power for one ton of coal per day. The coal bill, added to the interest, in this case amounts to merely a nominal sum for the power. The method employed for obtaining this result is one which would not have suggested itself to a man unskilled in the higher science of steam engineering. The very proposition to use 45 pounds of coal per horse-power, involving, as it does, an expenditure of more than 6½ pounds of coal per horse-power per hour, when the best engines reduce the figures by more than one-half, would have made one unskilled in the science hesitate to suggest such an arrangement.

Mr. Hoadley's experiments leading to the construction of an improved calorimeter, or instrument for the measurement of high temperatures, are likely to be of the greatest practical benefit in giving us an apparatus by which the temperature of furnace gases, and even of the furnaces themselves, may be accurately measured. We shall then be able to compare the temperatures of two furnaces, or of the same furnace under different conditions, as easily and as accurately as of two rooms at the ordinary temperature of the air. At present we know little of the degree of heat obtained under boilers or in our boiler flues. Want of this knowledge entails serious wastes, and, while we know they exist, we cannot take proper means for their prevention. The amount of the losses are only to be ascertained by long and roundabout methods, frequently involving several distinct sources of error.

We think what we have said is sufficient to justify us in our assertion that this meeting marks a most important epoch, and from it we may date an era in which wider knowledge and closer attention to the scientific principles involved in manufacturing operations will secure greater economies, improvements in processes, and elevate to the dignity of a science what may be called the art of the manufacturer.

"Natural Advantages."

The *Colliery Guardian* (London), in an editorial review of the meeting of the British Iron and Steel Institute, which has just closed, acknowledges that England has no longer "the monopoly of the field of iron-"making." For that matter it may be said that England has not had it for many years. It may be possible that the English believed that their country retained this monopoly, but if they did no one else believed it who knew better.

This article acknowledges the advances that have been made in the practice of iron working and making by other nations, and concedes the need of further improvements to be made in England. The especial point in the article to which we wish to direct attention is the following extract: "When every Bessemer converter in the "United States produces thrice as much "steel in a given time as ours do, it is "evident that we have been relying too "much on our natural advantages." This is a curious example of *non sequitur*. We confess we do not see why the fact that our converters produce three times as much steel in a given time shows that England has been relying too much on her natural advantages. If we might be allowed to suggest, we would say that this fact, which is by no means a new one to the English steel makers, shows that their confidence in their own superiority has led them to refuse to learn when the opportunity has been pressed upon them again and again, and all at once they waken to the fact that they have been living in a fool's paradise.

There is another point in this editorial worthy of remark. It states it as an evident fact that, as compared with the United States, England has natural advantages. What are they? She has none. On the other hand, we have every natural advantage over her, and if her ironmasters are solacing themselves with the thought of superior natural advantages, they are destined to a rude shock. Our deposits of mineral fuel are many times larger than theirs. Our iron ore is not only greater in amount as a whole, but of the better kinds we have deposits in comparison with which theirs are mere specks. Our limestone is as good and as abundant as theirs. Where are the superior natural advantages? They do not exist. The only fact that can be adduced in favor of England—that can be construed to be a natural advantage—is that her raw materials are closer together than ours, and that the cost of freight is thereby reduced; but even with this against us, with the same wages that are paid in England we could produce iron cheaper than it can be produced there. But it is the theory of protection that fair wages mean national prosperity and progress; and it is because of higher wages here that we have been led to improve our machinery and make it do more work. Cheap labor is the cause of all the "conservatism" in British industries of which we hear so much. Just now wages in this country are too high—but a reduction to English standards would be a national calamity in every sense.

An idea which has occupied the minds of many inventors, among them of Tessié du Motay, is again brought forward in France. There is something particularly attractive in the proposal to manufacture oxygen on a large scale, and to use it for heating, lighting, bleaching, &c., in the metallurgical, chemical and textile industries. Wherever intense reactions, attended with a saving in time and other advantages, are required, the employment of pure oxygen instead of air seems to hold out great promise of success. The latest proposal comes from Brin Brothers, a French firm who have been operating their process on a somewhat extended scale at Passy, near Paris, for some time. It is based upon the fact, observed first by Boussingault, that baryta will at a certain temperature absorb oxygen, and at a higher heat will again part with it. If, therefore, air be passed through a vessel containing this substance, oxygen is withdrawn from it, and when further heated oxygen gas will be obtained. Gondollo followed out the idea of utilizing this reaction in 1869, but did not succeed in producing a gas richer than 65 per cent. There were besides practical difficulties of a different nature, arising chiefly from the fact that after a while the baryta lost its property of absorbing oxygen. This trouble, it is claimed, has been overcome, and at Passy the nature of the material was unchanged after 400 operations. With 2800 pounds of baryta and 10 operations per 24 hours, 17,500 cubic feet of gas, containing 95 per cent. of oxygen, have been made, and from actual experience it is estimated that it would cost about 70 cents per 1000 cubic feet in France. While it is at present difficult to see any great future for such a gas in metallurgical operations, there seems to be a large field in other directions.

Consular Overcharges on Tin Plate Invoices.

A correspondent in Philadelphia, in the letter printed below, calls attention to a growing evil which bears somewhat too heavily on a trade in which margins are necessarily close when the business is conducted honestly:

PHILADELPHIA, May 19, 1881.

To the Editor of The Iron Age.—DEAR SIR: We desire to call your attention, as well as that of the public, through the medium of your columns, to the imposition practiced upon importers under the charge "consul's fees," which is perpetrated in London and Liverpool on all invoices of goods shipped from either point. We have in our hands at the present writing an invoice dated Liverpool, May 6, 1881, in which the charge for "consular" fee is 15/, which, estimated on the basis of exchange as fixed by our government, viz.: $4.86.65 to the £, is equivalent to $3 65, notwithstanding that immediately under the signature of the consul, printed in large type, are the words, "Received fee, $2.50." We do not know of any process of figuring whereby 15/ can be made equal to $2.50, for if it could, we would consider it a very desirable method of settling sterling bills and a large saving to the importer.

This may seem like a trifling difference, but it must be borne in mind that all large houses who import have several hundred invoices in the course of a year, and a tax of this kind becomes decidedly onerous.

In 1873 the fee charged was 10/, and as consuls are authorized by law to charge only $2.50, this charge of 10/ would seem consistent; but it appears to us that the consuls, both at Liverpool and London, entirely disregard the legal limit fixed and charge whatever prices they please, and we presume they will continue to do so until called to halt.

In reality, we can see no reason for any charge whatever, as it certainly, in our judgment, seems to serve no practical purpose; but if there be a necessity for this tax, it should certainly be regulated under some legal provisions that cannot be abused at will by government representatives at any port.

Yours truly,
GUMMEY, SPERING, INGRAM & CO.

We are happy to say that this subject has already received the attention of Congress. On Thursday last Mr. Beck, in the United States Senate, called attention to the fact that some of the importing houses of New York were complaining of orders issued by the consul at Liverpool and other consuls, who, instead of charging $2.50 for each invoice verified, charged $3.75. He therefore offered resolutions calling for full and accurate information as to the following points, to be laid before Congress on the first day of its next meeting:

1. Whether any consular officer of the United States has during the last fiscal year demanded or received for the verification of any invoice and certificate a greater sum as a fee than $2.50, and if so, the name of such officer?

2. Whether any consular officer of the United States has during the same period required the declaration attached to invoices according to section 2854 of the Revised Statutes to be verified by oath, and if such oath has been demanded, then before whom has it been taken, and has any fee, in addition to the consular fee of $2 50, been exacted for admistering the oath? If any such additional fee for the oath has been exacted in any consulate, then what has been the amount of the fee on each invoice? The total sum received from such fees in such consulate during the last fiscal year, and to whom paid; whether those fees have been included in the consular fees and return to the Government, and whether the Consul-General or consul or commercial agent has been personally benefited thereby, and if so, to what extent?

3. What sum has by each consular officer of the United States been received and retained as consular fees, and what sum has been paid to each as salary during the last fiscal year, and whether consular officers are permitted to receive and return any fees for any services as consular officer which are not stated in the consular returns?

And that the President of the United States be requested to inform the Senate whether the existing laws do or do not require that the declaration to be indorsed on invoices of merchandise to be imported into the United States shall be accompanied by the oath of the person making the declaration.

This resolution was agreed to without opposition, and, while it will be some months before the desired information can be laid before Congress, the fact that an inquiry has been started by the President through the State Department will have a most salutary effect upon the business morals of our consuls and consular agents. It is well known that overcharges for consular certification of invoices have been made for a long time. But in view of the action of the Senate on Thursday, the law making it an indictable offense for a consular officer to exact illegal fees, to make false returns to Washington of fees exacted or to pocket a larger compensation for services than the law prescribes, is likely to acquire a new interest for those amenable to its provisions. If any of our readers have additional or further complaints, we shall be pleased to receive and publish them for the information of the State Department.

The united protest of the Produce and Cotton Exchanges against the passage of the Brokers' Tax Bill, now before the Assembly, is entitled to weight at Albany. Resolutions condemnatory of the measure unanimously passed both bodies at meetings held on Monday. That feature in the bill which provides for an inspection of private books and accounts by "a set of political detectives," was denounced as inquisitorial and unprecedented in the legislation of this State, and it was affirmed with equal unanimity that a law like that now proposed, while decreasing the volume of business, will drive out of the State a large proportion both of the capital invested in it, and the wealth-producing labor which is employed by it. In support of this view, one of the members stated that 25 years ago New York was the center of the tobacco trade of the country, but the Legislature passed a bill somewhat similar to this, and the result is that there is not a single tobacco agency in this city.

NEW PUBLICATIONS.

RESOURCES OF SOUTHWEST VIRGINIA. By C. R. Boyd, E. M. Published by Messrs. John Wiley & Sons.

Unlike almost all of the States which lay claim to mineral wealth, the State of Virginia has done nothing since 1847, the time of Rogers' report, to aid in developing its mining and allied industries by publishing accurate information of its resources through the medium of a geological survey. It is known in a general way that Virginia is entitled to take rank among the most noted for her mineral wealth, but what knowledge of a recent date we possess is due entirely to private and individual enterprise. It is pleasant to note that both her own citizens and those of neighboring States are beginning to make vigorous and well-directed efforts to call attention to Virginia's undeveloped deposits of iron, coal, lead and zinc. Among those who, for a number of years, have been active in this direction is Mr. C. R. Boyd, who has devoted much study to one particular section, Southwestern Virginia. In the work now before us he has gathered the fruit of his labors in a form convenient for easy reference. In perusing it we have found it difficult to suppress surprise that so much wealth should be allowed to remain idle and unproductive for so long a period. As we on a former occasion printed a summary of what the volume before us contains in greater detail, we must at present content ourselves with a few notes on its plan and its scope. Mr. Boyd has taken singly the various counties making up the section he treats of, and after a few introductory remarks he gives a brief sketch of the topography of the county, followed by a description of its geological features, which is generally accompanied by a geological section. He then takes up the deposits of iron ores, manganese, coal, lead and zinc, and other minerals. This portion is usually worked out with as much detail as the limited developments will allow. The mineral springs, water powers, manufactures, agriculture, scenery, lines of transportation, and educational facilities are then treated of, and we may mention that a number of well-executed full-page plates aid the reader in forming an idea of the beauty of that section. It will be seen, therefore, that Mr. Boyd does not, by any means, confine himself to the mineral resources of the country, but has given his work a wider scope. The book is accompanied by a large geological map, and we may add that it is made attractive by good printing and clear engravings. We trust that it will do much to aid the progress of a section of our country which seems to have remained behind in the race, chiefly because of a lack of enterprise in making its natural advantages known to the world.

STUDIES ON THE THOMAS AND GILCHRIST PROCESS (STUDIEN UBER DEN THOMAS-GILCHRIST PROZESS). By Josef von Ehrenwerth, Leoben. Published by the author.

The great practical value of thorough theoretical research has been strikingly instanced by the suggestive character of Prof. Ehrenwerth's work on the basic process, as from their own statements we know that German metallurgists owe important improvements to the work of that scientist. Prof. Ehrenwerth, too, appears to have close connections with the leading men of Austrian and German steel industry, and he displays a thorough knowledge of the questions at issue. He can justly point to the fact that his investigations have materially aided progress and have shed much light on difficult problems connected with the basic process. The volume before us, which is a reprint of a series of articles first published in the *Oestr. Zeit. f. Berg. und Hütten-Wesen*, is at present the ablest and most complete discussion of the theory of the basic process, and it contains besides a very valuable series of chapters of practical suggestions derived from theoretical study. The style is often, unfortunately, not as clear and as lucid as it might be, and the book is somewhat dry reading, but still these difficulties are redeemed by the value of the matter presented. We shall endeavor at a future time to present the leading conclusions and the manner in which they were reached, and will content ourselves for the present by recommending the volume to the attention of those who wish to follow the subject more closely.

Argument on the motions and counter motions in the suit brought by Attorney General Ward against the Manhattan Railway Company was adjourned on Monday to the 27th inst. Mr. Cyrus W. Field warmly vindicates the terms on which the three elevated railroad companies entered into a working agreement or lease, though he protested against the subsequent management, for which the directors of the Manhattan Company are responsible to their constituents, the stockholders who elected them.

Fast Melting in a Cupola.

The following letter from Mr. Edward Kirk will, no doubt, be read with interest:

OSWEGO, N. Y., May 18, 1881.

To the Editor of The Iron Age—DEAR SIR: When visiting different foundries I have often met foundrymen who have a great deal of trouble with dull iron or slow melting, and I am asked to explain why their cupolas do not melt hot or fast. To answer these questions correctly to every foundryman is no easy matter, for there are a great many reasons why a cupola does not melt properly, even after it has been properly constructed. I have no time at present to go into details as to the causes of poor melting, but before long I shall endeavor to give you a few of the causes of poor melting (from practical observation), which may be of interest to your readers.

At present I shall describe two heats which I ran with a view to doing fast melting, in one of the best arranged cupolas in the country, which could not be made to melt more than four or five tons per hour with the best fuel. In these heats nothing but very small broken coal was used, and every pound of it was accurately weighed before it was charged into the cupola. The time given for melting the heat was from the time the blast was put on until it was taken off, and not from the time the first tap was made. I will first give a full description of this cupola, which may be of interest to some of your readers who are contemplating the building of new cupolas.

I consider this a well-arranged cupola in every particular, except that the stack should be two-thirds as large as the shell of the cupola instead of one-half. The shell of this cupola is 72 inches diameter and 17 feet high from iron bottom tapper. From cupola shell to stack is 6 feet, and reducing from 72-inch shell to 40-inch stack. The entire hight of the cupola and stack is 60 feet; hight from iron bottom to top of tuyeres, 13½ inches; hight from iron bottom to bottom of charging door, 13½ feet; size of charging door, 30 x 36 inches (double doors); belt air chamber on outside of cupola, 10 x 12 inches; air chamber supplied with blast from two 10-inch and one 13-inch branch pipes from a main pipe 24 inches diameter and a No. 9 Sturtevant blower. The lining of cupola, 9 inches; lining of stack, 4 inches; diameter of cupola inside of lining, 54 inches; size of tuyeres, 12 x 2½, laid flat; number of tuyeres, 8; hight of bottom of tuyeres from sand bottom, 7½ inches.

This cupola was charged in the following way and a light blast put on for 10 minutes, and then the full blast put on and kept on through the entire heat without any variation:

HEAT MELTED IN THE FOUNDRY OF THE RHODE ISLAND LOCOMOTIVE WORKS, PROVIDENCE, R. I., APRIL 26, 1881.

	Coal used.	Iron melted.
	Lbs.	Lbs.
Coal for bed	1,656	
1st iron on bed		4,000
2d charge coal	400	
2d charge iron		4,000
3d charge coal	450	
3d charge iron		4,000
4th charge coal	450	
4th charge iron		4,000
5th charge coal	450	
5th charge iron		4,000
6th charge coal	450	
6th charge iron		4,000
7th charge coal	450	
7th charge iron		4,000
8th charge coal	450	
8th charge iron		4,000
9th charge coal	450	
9th charge iron		4,000
Total	5,206	36,000

This heat was melted in two hours and 40 minutes; 6 9-10 pounds of iron was melted with each pound of coal used, and 225 pounds of iron melted per minute from the time the blast was put on until taken off.

HEAT MELTED IN THE FOUNDRY OF THE RHODE ISLAND LOCOMOTIVE WORKS, PROVIDENCE, R. I., APRIL 27, 1881.

	Coal used.	Iron melted.
	Lbs.	Lbs.
Coal for bed	1,840	
1st iron on bed		4,000
2d charge coal	400	
2d charge iron		4,000
3d charge coal	400	
3d charge iron		4,000
4th charge coal	400	
4th charge iron		4,000
5th charge coal	400	
5th charge iron		4,000
6th charge coal	400	
6th charge iron		4,000
7th charge coal	400	
7th charge iron		4,000
8th charge coal	400	
8th charge iron		4,000
9th charge coal	400	
9th charge iron		4,000
10th charge coal	200	
10th charge iron		2,000
Total	5,240	38,000

This heat was melted in two hours and forty minutes; 7¼ pounds of iron was melted with each pound of coal, and 237½ pounds of iron melted per minute from the time blast was put on until taken off. The iron was hot enough for stove plate in either one of these heats. These two heats were experimental heats, with a view of fast melting, and the capacity of the cupola was increased from 5 tons to over 7 tons per hour.

EDWARD KIRK,
Of Kirk & Merick, Oswego, N. Y.

Two important events of the past week, which have a wide interest in business circles, are the decision of the Supreme Court of Pennsylvania, affirming the legality of the election of Frank S. Bond and others, as officers of the Philadelphia and Reading Railroad, and the collapse of the Anglo French Union Bank, of Paris, said to have been established by Mr. Gowen, the late president of that road, through which it was expected to float the deferred bond scheme, lately prominent in public notice.

WASHINGTON NOTES.

(*From Our Own Correspondent.*)

WASHINGTON, D. C., May 25, 1881.

The manufacturers of iron car truck channels, at their recent hearing before the Secretary of the Treasury, stated that whatever his decision might be they hoped that it would not be long delayed, as the uncertainty caused a great depression in this branch of the iron industry; they showed that large orders were then awaiting the action of the department, and as soon as this was officially promulgated the demands for this class of iron would be felt. The importers of car truck channels were notified to appear if they had anything to say on the subject in reply to the manufacturers. They replied that the difference between 35 per cent. ad valorem and 1½ cents per pound specific duties was so small, being but $2.50 per ton, that the amount involved would not justify the expense of a journey to Washington.

Accordingly, both sides having had an opportunity to be heard, the Secretary took the question up and has submitted his views as follows:

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
WASHINGTON, D. C., May 21, 1881.

Collector of Customs, New York.—The department has reconsidered its decision of October 12, 1880 (4677), relating to the duty on iron car-truck channels, and, upon the evidence now before it, has arrived at the following conclusions:

Schedule "E" of the tariff was intended to cover by specific enumeration all the forms of iron, as far as practicable, which were known to commerce at the time of its enactment, and which were practically material for use in the manufacture of other articles. Thus, many descriptions of bar iron, rolled or hammered, were enumerated, but, as it was possible that descriptions of rolled or hammered iron might be imported other than those specifically named, Congress added a provision for all other descriptions of rolled or hammered iron. This embraces angle iron, iron beams and the iron used in the construction of bridges, cars, buildings and other structures. Car-truck channel iron belongs to this general description, and, unless more special provision for it has been made elsewhere, it is dutiable under that provision. It is rolled into the shape designed for use and then straightened, but in some instances subsequently cut to special lengths and punched with holes. This cutting and punching does not, however, make it a completely manufactured article, any more than the cutting to special sizes and punching with holes made the tank plates mentioned in decision 4783 a manufactured article. That decision laid down the principle by which this case must be decided, and in accordance with the views therein expressed, iron car-truck channel, whether cut to special lengths or of ordinary lengths, and whether punched or unpunched, is held to be dutiable under the provision for rolled or hammered iron not otherwise provided for. You will take action accordingly.

H. F. FRENCH, Acting Secretary.

Assistant Secretary French, accompanied by Mr. James, Chief of the Customs Division of the office of the Secretary of the Treasury, left for Pittsburgh on Tuesday, upon the invitation of the iron manufacturers who were here recently. Mr. French stated to your correspondent that he was anxious to obtain practical knowledge of the great manufactures of iron and steel, so that he might better understand these interests.

It is stated that the tank plate case will come up for consideration shortly. Secretary Windom shows an evident desire to give all the great industries the most favorable construction of the law, as far as classification for duties is concerned, wherever he can.

Mr. J. E. Fry, of Johnstown, Pa., calls our attention to errors in Table II in Mr. Parker's paper on the Corrosion of Iron and Steel, printed in last week's issue of *The Iron Age*. The errors, which appear also in the original, printed by the Iron and Steel Institute, are a displacement of the decimal point in samples D, F, E and the means obtained from them. We give below the corrected table:

TABLE II.—COMPARATIVE LOSS OF IRON AND STEEL, TAKING LOSS OF LOWMOOR IRON AS STANDARD.

Description of Metal.	Cold water.				Boilers.			Mean of columns 1, 2, 4, 5, 7 & 8.
	Sea. B.	Bilge. C.	Mean of B, C.	Atmosphere, London. A.	Zinc in boiler. D.	Mean of F, E.	Collier boiler. F.	F. & O. boiler. E.	
Parkhead common iron	0.97	0.94	0.95	1.33	1.52	1.22	1.24	1.21	1.29
Skerne common iron	0.64	0.77	0.83	1.01	1.38	1.12	1.12	1.12	1.12
Leeds forge best iron	0.79	0.88	0.83	1.01	1.26	1.00	1.00	0.78	0.86
Taylor's best iron	0.93	0.98	0.95	0.93	1.09	1.00	1.00	0.91	0.95
Bowling best iron	1.06	0.96	1.01	1.00	0.76	0.96	1.00	0.92	0.96
Farnley best iron	0.82	1.06	0.94	1.00	0.79	1.12	1.00	1.04	1.08
Lowmoor best iron	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Landore mild steel	0.98	0.98	0.98	1.04	1.37	1.18	1.27	1.18	1.23
Brown's mild steel	1.01	0.93	0.97	1.01	1.35	1.17	1.31	1.20	1.25
Bolton mild steel	0.93	1.01	0.97	1.00	1.29	1.12	1.00	0.97	1.03
Steel Co. of Scotland (mild steel)	0.97	0.94	0.95	1.03	1.28	1.09	1.00	0.85	0.98

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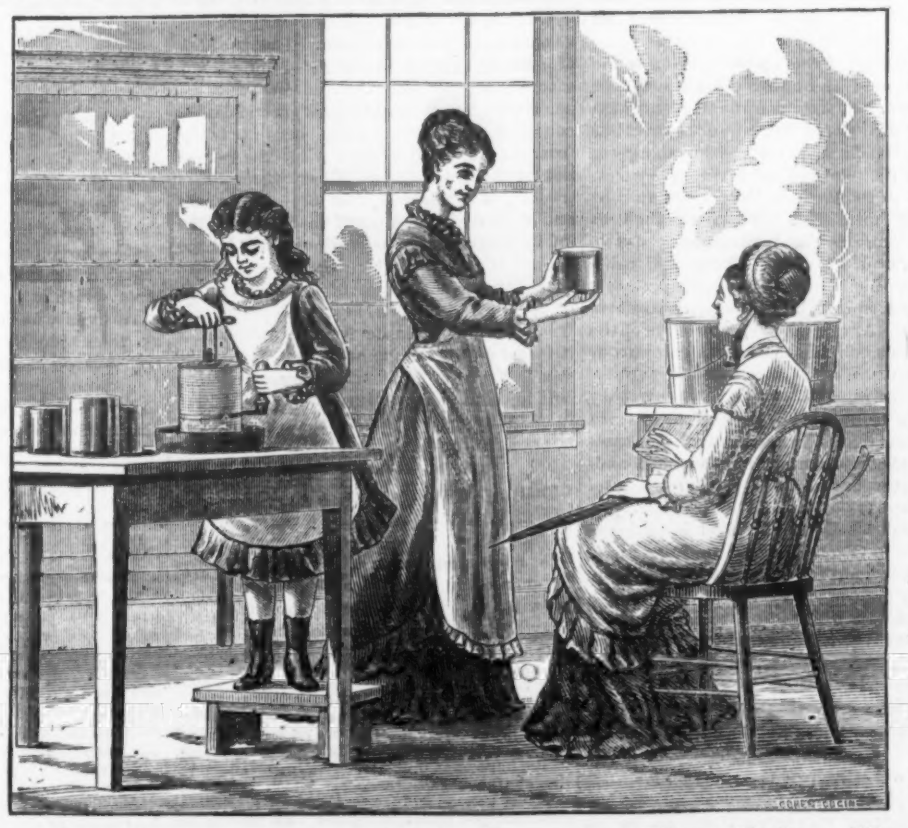

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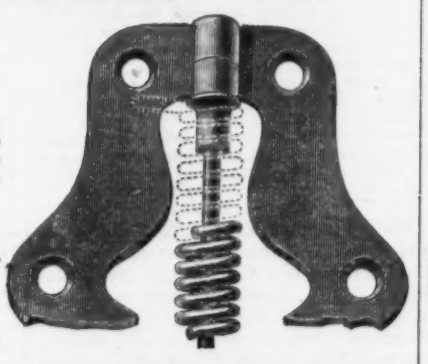
3 " No. 303	4.40	3 " No. 313	8.80
4 " No. 305	6.75	4 " No. 315	13.50

WROUGHT BRASS.

SINGLE JOINT.	Per doz. Pairs.	DOUBLE JOINT.	Per doz. Pairs.
2⅜ inch, No. 1	$3.00	2⅜ inch, No. 7	$6.60
3 " No. 3	4.50	3 " No. 9	8.30
5 " No. 5	7.50	5 " No. 11	16.50



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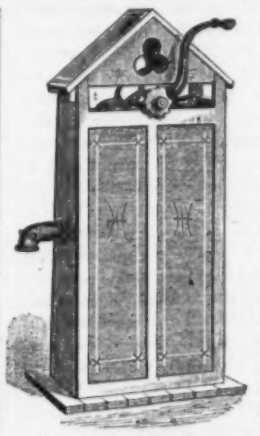

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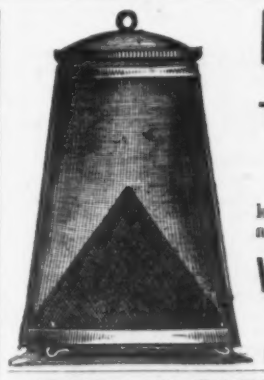

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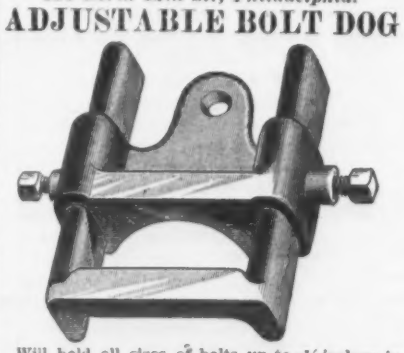

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Papers on Practical Founding.—XXV.

BY EDWARD KIRK.

RAMMERS.

For packing the sand into the flasks rammers of various shapes are used, but the one principally employed is that shown in Fig. 75. This rammer is made from 3 to 4 feet long, usually 3½; the butt or round end is made of cast iron or brass, and is from 3 to 4 inches in diameter and half an inch thick at the outer edge. In the center is a stem or socket, 4 or 5 inches long and 1¼ inches in diameter, with a hole in it 2 or 3 inches deep for the wooden handle. The pier or flat end is made about 3½ inches long by

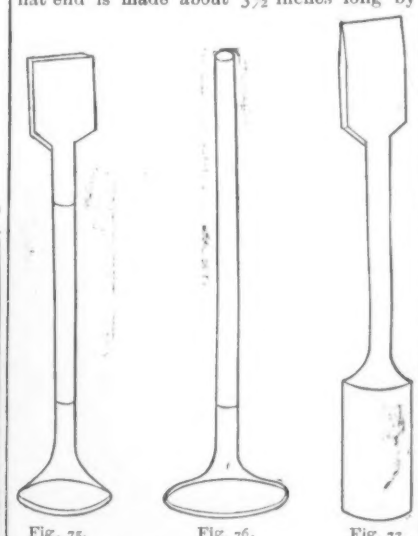

Fig. 75. Fig. 76. Fig. 77.

Practical Founding.—Rammers.

3 wide and ¾ inches thick, and is provided with a socket similar to that on the other end of the rammer and fitting the wooden handle. This end may be made of iron or brass, but when made of brass it should be steel-pointed, and when made of cast iron it should be chilled on the point to harden it and prevent it from wearing. The butt and pane are generally ground or turned perfectly smooth to prevent the sand from sticking to them. There are several little variations in the shape of these panes and butts, which are made according to the fancy of the molder, but their general outlines differ but little from those I have described. The flat or pane end of this rammer is used for ramming or paneing the sand around the sides and ends of the flask, and along the sides of the cross bars to pack it solidly in all the little corners, so that the sand will not fall out when the cope is lifted from the drag, and the butt end is used for ramming or butting the sand in the drag and between the cross bars, where it can be gotten at readily and where it would take too much time to ram it with the pane end of the rammer. In Fig. 76 is shown a single-ended rammer, which is used by a great many stove molders through the East for butting off the drag instead of tramping it off, as is generally done in stove molding. The butt of this rammer is made of the same shape as that of the rammer Fig. 75, but it is heavier and from 6 to 7 inches in diameter, which is too large to ram between the bars of the cope; it is only used for ramming the drag. In Fig. 77 is shown the old-style rammer, which is still used in some foundries; it is made entirely of hard wood, and by some founders the butt and point of the pane are plated with iron to prevent them from wearing, but others use them without plating. This rammer is very clumsy and inconvenient, and at the present time it is used only in small, out-of-the-way foundries, where it is not known that Tubal Cain is dead and that his style of rammer has been

Fig. 78. Fig. 79. Fig. 80.

Fig. 81. Fig. 82.

Practical Founding.—Draw Hooks.

improved upon. In stove founding each molder furnishes his own rammer, and he generally takes great pride in keeping it clean and free from rust, so that the sand will not adhere to the pane or butt.

RIDDLES.

In stove founding the common round riddles, about 18 or 20 inches in diameter and 4 inches deep, are used for riddling the first sand upon the pattern. These riddles may be made of iron or brass wire, but one brass riddle, if properly made, will outlast three iron riddles, for the latter soon rust and give way round the sides and across the supporting wires, and they are then worthless for foundry use, while the brass riddle will last until it is worn full of holes from actual use. The fineness or coarseness of the riddles used in stove founding depends upon the quality of work to be made, but the numbers generally used are from 4 to 10. In some foundries each moulder uses only one riddle, which is generally a No. 5; but in most of the large stove foundries, where first-class work is made, two riddles are usually employed by each molder—one fine one, a No. 8 or 10, for riddling the first sand on the face side of the pattern, and a coarse one, a No. 4 or 5, for riddling a body of sand over the sand riddled on the face of the pattern, and for riddling the sand on the cope side of the pattern. By thus using fine and coarse riddles, far better castings can be made with less trouble than with one fine riddle; for, when a very fine riddle is used, it takes considerable time and hard labor to riddle a proper amount of sand on the pattern, and the molder, if a little behind, will often not riddle a sufficient amount of sand to cover the pattern properly before he shovels the unriddled sand into the flask. Hard lumps of sand may thus be thrown on the pattern causing a scar or blow-hole on the casting, while, if the molders had two riddles the coarse riddle would break up the hard lumps of sand. Better work can be made with a coarse riddle when a proper amount of sand is riddled on the pattern, than can be made with a fine riddle when there is not enough sand riddled on the pattern.

DRAW-HOOKS.

This is the name given to the hooks with which the patterns are drawn from the sand. The shape of these hooks varies little in different parts of the country. In Fig. 78 is shown the style of hook generally used through the West. It is made of ½-inch wrought iron, the ring is solid and welded to the shank, and the shank is tapered down to a point and a small hook is formed on one side of it, as shown. When this hook is used, a draw-hole is made in the pattern near the center, into which the small end of the draw-hook is inserted when it is desired to draw the pattern from the sand, the pattern being steadied upon the hook by resting the thumb and forefinger upon it.

Fig. 79 represents the hook generally used through the East. It is made of the same size as the other, but, in place of the hook on the end of it, it has a square shank or foot, and, instead of a draw-hole in the pattern, the small piece, Fig. 80, is riveted or brazed on the pattern. This way of making a draw-hook and arranging the pattern is far better than the other, for the hook fits more solidly into the pattern. It is not so difficult to hold the pattern steady when drawing it from the sand, and the face of the mold is not torn up as it is when a draw-hole is made through the pattern and the point of the draw-hook allowed to project through it. With this arrangement a more perfect face can be given to the casting, for it is almost impossible to fill up the hole made in the face of the mold by the point of the draw-hook, so that it will not show on the face of the casting. With this arrangement, the only stopping up of the draw-hole necessary is on the cope side, and it takes less time to stop it up, for it does not make any difference if it is a little rough on that side. This draw-hook is the best in use for stove plate, and the one that is being generally adopted by stove founders.

In some foundries no draw-hooks are used for small patterns, a small lug or projection about 1 inch long being made on the cope side of the pattern to serve as a handle for drawing it from the sand, and the mold made in the cope by this handle being stopped up with sand or the handle broken off the casting. These small handles are better than a draw-hook for drawing the pattern, but they can be used only on small, light patterns, for the molders cannot lift a large pattern steadily by so short a handle. The handle should not be made over an inch long, for it would interfere with the making of the cope side of the mold, and make it more difficult to lift the sand from around it in the cope.

The draw-hooks are generally used for rapping the patterns to loosen them from the sand before they are drawn from the mold, and as patterns are often broken by rapping them too hard with a heavy draw-hook, several attempts have been made to get up a draw-hook with which a pattern could not be broken. Figs. 81 and 82 represent two draw-hooks designed for this purpose. In Fig. 81 is shown a mallet draw-hook; the shank is made like that of an ordinary draw-hook of either of the styles already described, and, in place of the iron ring on the end, a small wooden mallet is put on. This draw-hook is very good for rapping the pattern, but it is not so good for drawing it from the sand, for the ring on the end of a draw-hook is designed to rest against the palm of the hand, and assist in holding the draw-hook steady, so that the pattern may be drawn steadily from the mold. Now, if the mallet is made large enough to be of any service for rapping the pattern, it cannot be held in the hand, and the shank must be made so long that the mallet will stand clear of the hand. But the round shank will roll in the hand and cannot be held steady, and for this reason it is difficult to get the molders to use this draw-hook, and it is but little used. In Fig. 82 is shown another style of draw-hook for rapping the pattern; it is made entirely of steel, and the ring is made a little larger and lighter than that on an ordinary hook, and open on one side, as shown, so that it will spring when it strikes the pattern. This is a very good hook for rapping, and it is used in many foundries. I believe it is patented by a molder who lives in Pittsburgh, Pa., and who sells shop or individual rights.

The Mexican Minister on Commercial Relations.

The Mexican Minister to Washington, Señor Zamacona, whose intended resignation of that office is heard of in this country with sincere regret, addressed the Philadelphia Board of Trade recently, giving a very hopeful account of the commercial relations now existing between the Republic of Mexico and the United States.

It was during the Centennial that he first perceived the great good that would come from the cultivation of relations between the two countries. He saw, through the drapery of the great Exhibition, the vast resources of the United States, and it was from here that he had started to preach a kind of gospel of peace between the two countries and to remove suspicion and incredulity. Now that the trade had so grown, it delighted him to return here and speak of what had been accomplished.

The want of intercourse had produced a feeling in Mexico that the United States were further off than the countries of Europe. The removal of the Mexican boundary to the Rio Grande had also acted to estrange Mexico from the United States. Five years ago he had expressed the desire, now accomplished, that the two nations

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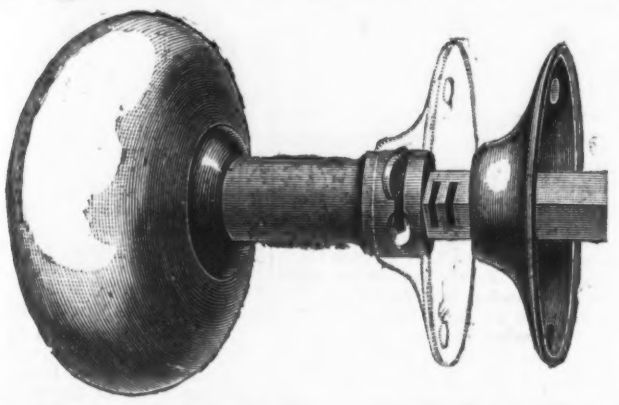

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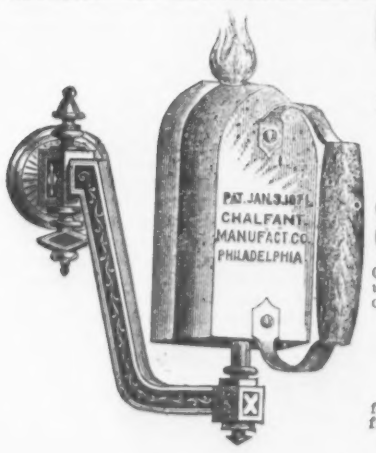

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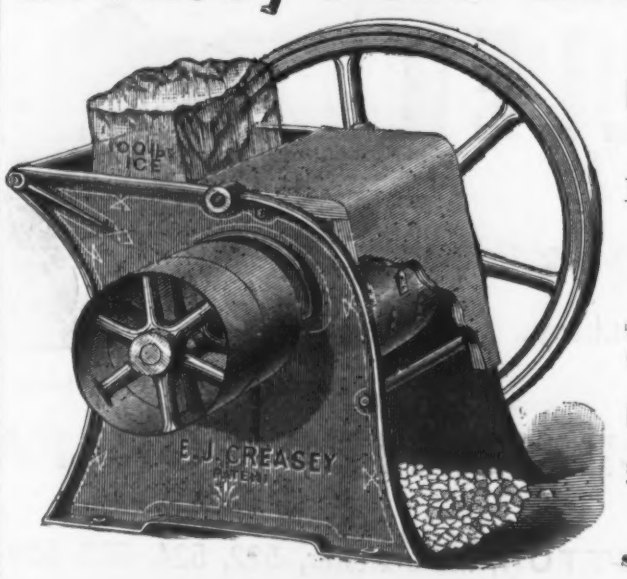

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should stand up and clasp hands across the Rio Grande. Very few people in Mexico now believe that every citizen of the United States is a cattle stealer, and few in this country now regard every Mexican as a brigand. It was wonderful to observe the development of the commercial relations of the two countries, the aggregate population of which is 60,000,000. The $6,000,000 of imports into Mexico in 1829 had, a few years ago, declined so much that it was considered ridiculous to talk of attracting any capital from the United States. Last year he had seen in Mexico stores full of goods from this country, and the hotels in the capital and in Vera Cruz are now filled with Americans. Two railroads are now being built from Mexico, one of which has 60 miles completed. The energy of American enterprise has been transplanted to Mexico, and now Americans are talking of building gas and water works in the principal cities of the republic. He was proud to-day that he had seen in operation in Mexico reaping and threshing machines and plows made in the United States, a result which could only be ascribed to progressive, reciprocal knowledge between the two countries.

The imports of cotton goods into Mexico had increased from 1876 to 1878 from 1000 to 3074 packages. To estimate the results of the Centennial Exhibition on mankind, it would be necessary to take a journey around the world. Arrangements are now being made to export to this country from Mexico the raw material of the Agave plant, of which excellent paper can be made, and which grows wild in profusion there. The great defect has been the want of transportation, but the railroads now being constructed will remedy this. Their construction invites the attention of all who are interested in extending the foreign trade of the United States. The gates of Mexico will soon be thrown open, and the people here should lose no time in assisting in developing local trade. Much has been accomplished in that direction, but much more remains to be done. It was a glorious thing to see two nations, heretofore estranged, actuated by a sudden impulse of fraternity and reconciliation. The result will be that Mexico will secure the best market for her products, but she will also profit by the setting in of a current of American ideas, including the sound principles of republican institutions. He rejoiced to hear daily in this country expressions of hope for the perpetuation of the Mexican Republic. All that is now needed is a consolidation of the two systems of railroads, and the locomotives, which drive away wild beasts, will drive away all feelings of animosity between the two countries.

IRON AND STEEL INSTITUTE OF GREAT BRITAIN.

THE MAY MEETING.—II.

A paper which followed that read by Mr. Parker, and which was discussed in connection with it, was that of Mr. William Denny, of Dumbarton,

ON THE ECONOMICAL ADVANTAGES OF STEEL SHIPBUILDING.

Mr. Denny held that the estimate of Mr. Martell of the saving on the weight of iron required in building a steamer of steel was too sanguine. Mr. Martell had placed the reduction at 18 per cent. The experience of his firm had been that the saving averaged 13½ per cent., and to prove it Mr. Denny gives the invoiced iron weight of a spar-decked steamer of about 4000 tons, gross. Giving the iron all the advantage, the difference in cost in its favor would be £3574. As the weight of iron actually worked into the iron steamer was 2123 tons, and the weight of steel and iron worked into the steel steamer was 1847 tons, there would be a difference in favor of the latter of 276 tons, which would be the increase of dead weight capacity. At present prices for material and present rates of freight, the increased price would pay itself in two or three years. Mr. Denny gave calculations and details that a similarly favorable result would be obtained with smaller steamers of a plainer type.

After expressing the conviction that the price of steel would be further reduced, Mr. Denny spoke as follows on the future of steel in shipbuilding: "As to the future of steel, I think even those who up to this point have been its opponents, must admit that there can be very little doubt of its prospects. It has much in its favor, and requires only some little self-restraint and self-denial on the part of steel manufacturers to bring about its ultimate and complete success. If these gentlemen, instead of trying to claim for themselves, as they sometimes do, a specialty in the manufacture, would set their whole energies to the reduction of the cost of the material, and at the same time to the perfection of its quality, there would be little doubt about the future. Steel of an unreliable quality has been made, and may be made in the future; but it will be, as in the past, the exception, and I believe in every succeeding year a rarer exception. So far steel has fought its way in the face of many doubts and difficulties, and has gradually acquired the confidence of the public in the main points of facility of workmanship and of reliability. I believe this reliability will in the future, when it becomes sufficiently appreciated, enable a steel ship to be insured at a less cost than an iron ship, as the risk she runs either in collision or in grounding or running on a rock is very much less. In a paper I had the honor to read before the Institution of Naval Architects last year, I gave an example of this in the case of the Rotomahana, a steamer built by us for service in New Zealand. According to the opinion of competent judges, had this vessel been built of iron, she would have been a total loss, instead of being, after running upon a rock, not only sound and watertight, but very easily repaired.

The facts as to the economics of the subject which I have had the honor of bringing before you on this occasion, prove that upon this point steel has in the higher class of steamers a clear advantage, and that even in the case of heavy cargo carriers of moderate speed the advantage is decided. It is scarcely credible that the makers of steel, who up to this date have shown such enterprise and skill, will permit the question to remain for any length of time in a state of doubt. It is rather to be expected that they will see that a moderate cost of production, combined with excellence of quality, is the whole secret of their future. If we turn to the records of Lloyds, we find that during the last three years the progress of steel shipbuilding has been of even a more rapid nature than might have been anticipated. In 1878 there were classed at Lloyds 4500 tons gross of steel shipping; in 1879 this amount rose to 16,000 tons gross, and last year to 35,400 tons gross, showing that in three years the output of steel shipping classed at Lloyds had increased eight times. This year on the 1st January Lloyds had building to class 83,000 tons of steel vessels, and throughout the United Kingdom, inclusive of the above, 114,000 tons of steel vessels were known to be building.

"Regarding steel there has been only one doubt raised this year, and that is as to its corrosion. My opinion is that the doubts and fears on this head have been largely exaggerated. Theoretically there may seem cause to dread such corrosion, but the history of steel ships up to this date affords little ground for the opinion. Of the steel vessels built by my firm, only one, and that a small twin-screw, has been reported as in any way showing even a symptom of corrosion. That this was purely exceptional is shown by the fact that several other steamers of the same material have been running in the same waters, and with the most satisfactory results, no more mention of corrosion being made even in the case of the original steamer. Of the seagoing steamers built by my firm, only one has shown any corrosion, and that has not been in the steel, but in the iron stern frame and rudder forgings and in some small iron plates on the rudder, the large steel plates of the rudder and the whole shell plating of the ship, which is of steel, being perfectly free from corrosion."

As in all discussions before a body like the Iron and Steel Institute, the points touched upon were numerous, and while valuable information was elicited, minor details were chiefly dwelt upon. In regard to the relative corrosion of iron and steel, much evidence was given in favor of steel. Mr. Snelus thought that pitting, notably in plates manufactured many years ago, was due to an excess of and an unequal distribution of manganese in the metal, while Mr. White, speaking for the Admiralty, stated that in order to avoid the corrosion induced by the galvanic action between the steel and the layer of scale on it, they pickled the plates at the Royal Navy yards. As to the price of steel plates, Mr. Snelus pointed out that steel makers were laboring under one disadvantage. They began with a steel plate with an ingot worth £5 per ton, and it took about 32 cwt. of ingots to make a ton of finished plates, including sketch plates. There was a considerable portion of that material at £5 per ton which went back to the melting furnace at, perhaps, £3 per ton. Now that was different in the case of iron. They began with a puddled bar at £4 per ton, and the scrap became a No. 2 iron, which was worth more than the puddled bar, and, therefore, the steel manufacturers were not in as good a condition in respect to the cost of plate, unless they could find an outlet for the scrap nearer to an ingot than they could at present put upon it.

Other points touched upon during the discussion were the necessity of putting more "work" into steel plates, and the importance of close testing

As we have already called attention to the importance of a paper read by Mr. Alexander E. Tucker, Rhymney, we make room for it here:

A NEW METHOD FOR THE DETERMINATION OF OXYGEN IN IRON AND STEEL.

The principle and practice of both steel and puddling processes, as well as the subsequent mill practice, render it somewhat probable that oxygen in the form of oxide may often exist in the manufactured product, and that many cases of red-shortness, and even failures when cold, may be properly ascribed to an excess of oxygen. There is, I believe, no method for determining oxygen which can be used for technical work, except that of Mr. Bettel, recently published, whose system seems more applicable to the determination of cinder in iron. The method to be described is a development of what is now an important part of the basic process, and I may add that it was at the suggestion of my friend, Mr. Gilchrist, that I pursued such a line of experiment. The method has the advantage of great simplicity, though the time occupied is somewhat long. It is based on the following grounds: If an iron or steel containing oxygen be melted in contact with pure charcoal, a removal of oxygen and an absorption of carbon will take place, and if we weigh the iron before and after the experiment, and estimate the carbon before and after the experiment, we have data from which we can estimate the oxygen originally present in the steel.

The first consideration in experimenting on this process was, could 1000 grs. of steel be melted without serious alteration in weight? To test this point, I melted 900 grs. of the product obtained from a previous experiment, and from which, therefore, the oxygen was removed. The button weighed 899 78, showing a loss which, as it would come out as oxygen, was too great. I noticed, however, that the greater part of this loss was due to a little of the molten steel being projected on the lid of the crucible. I therefore placed a disk of thick filter-paper on the top of the drillings to be tested, and covered this with a little charcoal. This plan much reduced the loss, and on burning the carbon cover in a muffle, I obtained 0.15 of F_2O_3; on adding this as iron to the button, I obtained a loss of only two hundredths on 900 grs. of metal, of course calculating from the carbon absorbed by the steel.

The following may be taken as an average of three experiments which give 0.288, 0.280, and 0.300 of FeO in a sample of burnt steel:

1000 grs. of burnt steel of 0.281 C.	grs.	2.810
1018.56 (weight of button) of 2.169 C.	grs.	22.000
Gain due to C. absorbed		19.190
Add original weight		1019.190
Deduct actual weight		1018.560
Oxygen removed		.630
Or as FeO	per cent.	0.288

A sample of blown metal gave 0.68 per cent. of oxygen = 3.09 FeO. Another sample of blown metal gave 1.71, 1.74, 1.69 of oxygen.

The details of the process are as follows: I brasque a plumbago crucible (Morgan's) with charcoal containing under 1 per cent. of ash. The charcoal is flour-fine, and on damping with water containing a little sugar and well ramming, makes a lining which will serve by a little patching for many meltings. I use a Fletcher gas furnace, and the time occupied in melting 1000 grs. of steel is under half an hour, starting with a red-hot furnace. It is well to prolong the melting, in order that the button may be dead melted and the carbon be absorbed sufficiently to yield a friable button, somewhat similar to rich ferromanganese in fracture and just about as friable. When cold, the button is weighed and crushed fine in a steel mortar. Two carbons by combustion are then commenced, one of the original metal and another of the melted product. By using 100 grs. of the former and 20 of the latter, and five times as much double chloride of copper and ammonium with the former, the steels may be got to dissolve perfectly in half an hour. I then filter through the combustion tube, and after well washing from all trace of copper, put the two tubes in an inclined metal tube over the combustion furnace. They dry very quickly, and the combustion may be proceeded with in the ordinary way. I have found it necessary to pass the oxygen very slowly over the carbon.* I have addded pure oxide of iron to steel and tested the process as above. The results, as might be expected, leave nothing to be desired. I think it proper to add that I have only experimented on this method, but the results obtained have been so satisfactory that I am induced to publish them.

In experimenting on this matter I had occasion to try to oxidize steel, the sample being silicious steel, containing 0.26 of silicon. I tried various methods with gaseous oxygen, but all to no purpose. I passed oxygen over it in a boat at a red heat. I then put in a Fletcher furnace, and kept it at a white heat for several hours, sending oxygen on to it through a tobacco-pipe, which bent with the heat; the steel was slightly melted at the edges of the drillings, and the gain in weight was only a fraction of what it ought to have been. I next tried the effect of heat and pressure, and exposed the boat containing the steel to a good red heat and a pressure of 3 inches of mercury. The oxidation, though much increased, was only about 30 per cent. of what it should have been. It then occurred to me that the cause of this paradoxical result was that I had carefully dried the oxygen. I therefore interposed a flask of boiling water by a T-piece, when the iron immediately burnt off, fusing the asbestos on which it was placed. When using pressure as above, I opened the end connected with the gauge, a U-tube. A flash immediately occurred in the combustion tube and its connections. After a few minutes I opened it again, and another flash occurred. I repeated this three times, after which I failed to obtain the flash. I think the explanation of this fact to be that the steel contains hydrogen. On heating, the hydrogen was evolved, and drove the oxygen from the place of ignition; the tube when red hot was filled with hydrogen, and by letting some escape an explosive mixture was brought over the red-hot part of the tube. This would form a very pretty lecture experiment.

Two conclusions seem derivable from these experiments: First, that certain steels may resist oxidation to a remarkable extent; and, secondly, that steel may require the presence of moisture or other media before it is attacked by oxygen. I may add, that I think practice and theory indicate that silicon retards oxidation, and I propose making experiments to determine this point.

Mr. Sergius Kern, of St. Petersburg, read the following paper

ON THE MANUFACTURE OF STEEL AND STEEL PLATES IN RUSSIA.

The greatest steel works in Russia are, without doubt, those of Obouchoff, situated near St. Petersburg. They manufacture, besides guns, which are their specialty, tires, ingots for the production of boiler-making and shipbuilding, and steel plates, which are mostly rolled at the Nevsky Works, also at St. Petersburg, as the Obouchoff Works have not the requisite rolling mills. The latter works are very extensive, and their growth must be directly attributed to their able management, for many years, by Capt. Kolokoltzoff, a member of this Institute.

I propose in this paper to communicate to the members of the Institute a short description of the method of working the Siemens-Martin furnaces at Obouchoff. The plant at these works consists of two 10-ton furnaces, without muffles or auxiliary furnaces for the previous heating of the scrap, the top ends of ingots, &c., of which the charge is composed.

The gas producers are arranged so that one part of them may be fired by wood and another by coal. The ladle turn-table is controlled by hand, and the molds are placed on a semicircular elevation.

The ingots which are cast at present are used for the rolling of tires and plates, mostly for shipbuilding. The charge is introduced into the furnace in a cold state at once, and very often pieces of steel (top ends of ingots) weighing about two tons are introduced, with other sprap and waste ingot ends. The average weight of the total charge is from 8 to 9 tons.

The charging of the furnace is completed in 1 to 1¼ hours, and a full supply of gas melts the steel, if all is going on well, in 3½ to 4 hours,* when about 1 to 1½ cwt. of ferromanganese is added. After this a sample is taken, and the usual forging and tempering tests are made. In case the metal has not attained the desired degree of softness, after some 20 to 25 minutes another test is taken; but, in most cases, it is found better to add at once a certain quantity of good iron ore (magnetic or brown) in the form of a powder. The reaction which then takes place soon brings the molten metal to the desired degree of softness. Before casting, a certain quantity of ferromanganese is again added (usually about ¾ to 1½ cwt.) The loss in the process varies from 7 to 9 per cent.

The whole process of making open-hearth steel in our furnaces, reckoning from the commencement of the charging till the tapping, occupies from 5 to 6 hours for medium steel (tires), and about 7 to 7½ hours for soft steel (plates). In 1 to 1¼ hours after the casting is over, the furnace is ready for another charge.

As to the burning out of the manganese during the process of tapping the steel, I have made some experiments which may be of interest. The results are appended:

Tests from the furnace.		Tests from the tire.	
Carbon.	Manganese	Carbon.	Manganese
Per cent.	Per cent.	Per cent.	Per cent.
A.... 0.50	0.65	A..... 0.50	0.26
B.... 0.45	0.62	B..... 0.45	0.24
C..... 0.42	0.55	C..... 0.41	0.22
D.... 0.52	0.66	D..... 0.52	0.30

I also annex some analyses of the raw materials used for steel making, as well as analyses of finished steel and tests of steel plates.

I may add that the usual mode of testing by taking samples out of the furnace is difficult to rely upon, and metallurgical engineers would be glad to have at command some efficient means by which they would be enabled to know quickly the percentage of carbon in the molten metal, as the Bessemer steel maker has in using the spectroscope. Various instruments have been from time to time devised, but they have all been found to be rather impracticable.

AVERAGE CHARGE FOR TIRES.

	Cwts.
Steel scrap	160
Ladle scrap	8
Pig iron	13

AVERAGE CHARGE FOR PLATES.

Steel scrap	115
Ladle scrap	25
Ends and shearings of steel plates	
Pig iron	7

CAST IRON USED (FROM SWEDEN).

	Per cent.
Graphite	0.05
Silicon	0.21
Sulphur	0.01
Phosphorus	0.02
Manganese	10.34
Copper	0.03
Carbon	4.52

STEEL SCRAP.

	I. Per cent.	II. Per cent.
Carbon	0.55	0.35
Graphite	0.02	0.11
Silicon	0.15	0.02
Manganese	0.13	0.30
Sulphur	0.01	0.02
Phosphorus	0.02	0.03
Copper	0.01	traces

The contents of the various elements found in the shearings of the steel plates are nearly the same as in Scrap No. II, but the carbon varies from 0.17 per cent. to 0.25 per cent.

SIEMENS-MARTIN STEEL.

Tires.		Plates.	
Carbon.	Manganese.	Carbon.	Manganese.
Per cent.	Per cent.	Per cent.	Per cent.
0.45	0.28	0.25	0.38
0.41	0.24	0.16	0.15
0.52	0.30	0.17	0.17
0.45	0.33	0.18	0.14
0.37	0.22	0.22	0.28

TEST OF STEEL PLATES.—UNANNEALED.

Carbon.	Manganese.	Tons per sq. inch. Breaking strain.	Elongation. Over 8 inch.
Per cent.	Per cent.	Per cent.	Per cent.
0.17	0.33	29.30	20.50
0.22	0.27	28.72	20.00
0.26	0.24	33.83	15.25

ANNEALED.

The contents of carbon and manganese in this case are the same as recorded above, and follow each other in the same order.	26.65 27.00 27.57	22.00 22.00 21.87

SCIENTIFIC AND TECHNICAL.

An English paper gives the following as a recipe used in Sheffield for

BLEACHING IVORY FOR CUTLERY HANDLES.

The mode of procedure is as follows: Place, say, 2 quarts of peroxide of hydrogen in a stone pot, adding 4 oz. liq. ammon. fort. 880 degrees, immerse the handles, and put over a common shop stove for 24 to 36 hours; the handles are then taken out and gradually dried in the air, not too quickly, or they would split. The deep color of the ivory is removed and a beautiful pearly-white ivory results when polished. The ivory is previously treated with a solution of common soda, to get rid of greasy matter and open the pores.

M. Raoul Pictet, of Geneva, so well known for his discoveries relating to the liquefaction of gases, announces the discovery of a method of

DISTILLING ALCOHOL BY ICE.

Two kilograms of ice are needed for the production of a liter of alcohol; that is, for the distillation of 110 gallons of alcohol, a little less than a ton of ice will be required. The cost of production will include only coal for working the steam engine which drives the air-pump and the sulphuric acid, the evaporation of which produces the ice. M. Pictet declares that this will notably diminish the expense of distillation, and suggests that the excise on alcohol should be proportionally increased.

At a recent meeting of the French Academy of Sciences, MM. Cailletet and Hautefeuille read a communication on researches made by them relating to

THE LIQUEFACTION OF GASEOUS MIXTURES.

Operating with a gas easily liquefiable and a so called permanent gas in capillary tubes, total liquefaction (yielding a homogeneous liquid) is obtained by first compressing the mixture at a temperature so high that the strongest pressures prove powerless to abolish the gaseous state, then lowering the temperature regularly, so that all points of the tube pass at the same time through the temperature at which is produced a change of state. The authors thus obtained condensed carbonic acid, holding a large proportion of oxygen, hydrogen or nitrogen, these latter substances concurring to form the liquid, though the temperature was too high for them to exist separately in that state. The results of experiment with cyanogen and carbonic acid are analyzed. The assimilation—generally very imperfect—of solution of a gas to its liquefaction probably here applies. The mixture retains its characters at temperatures considerably above that corresponding to the critical point of its less easily liquefied element.

Recently, Prof. W. L. Dudley, of Cincinnati, called attention in a lecture to the Holland process for

WORKING AND MOLDING IRIDIUM.

After the metal is brought to a high heat and phosphorus added it is cast into any desired form, and the phosphorus is removed finally by heating the metal again in a chalk bath. It is like steel in appearance, but is nearly as hard as the ruby. Acids cannot injure it nor can rust consume it. As the negative carbon in the electric arc it was used for 60 hours without any loss in weight or change in form. This metal is so refractory that it cannot be hammered into shape when hot, and it resists the file. When in the way above stated it is molded into the form, as near as may be, of the article required, it is ground or cut to the finished state by copper disks revolving at a high velocity, on which emery and water are poured.

The Edson Recording Gauge.

At a recent meeting of the Polytechnic Club of the American Institute, Mr. M. B. Edson presented some facts of interest respecting recording steam gauges and speed recorders, which we condense as follows:

In opening, the speaker took up the great dangers arising from the use of steam, and pointed out many of the methods by which they might be avoided by care and an intelligent regard for well-known laws. In cities where boilers are found beneath the sidewalks of almost every down-town block, the danger to the public can hardly be estimated.

The advantages of an automatic tracing showing the variations of pressure, whether in a water main, a tank or a steam boiler, were presented, yet, great as they are, they are hardly recognized by mechanical engineers in general.

In the case of steam boilers the automatic record has a double value—it is a check upon the fireman, and an unimpeachable witness if he has done his duty. To the intelligent owner it gives a better insight into the workings of his engine room and fire room than he could obtain if he should attempt to make a continuous record for himself during a given period of 24 hours. As a means for locating the blame in case of accident or dispute it is invaluable, and gives a record which may be of the greatest service both to the engineer and the owner.

A number of large, finely shaded diagrams were shown illustrating the construction of the recording gauge. In the gauges made by the speaker a very marked feature was the use of a 6-inch corrugated diaphragm, in which the corrugations increase in size from the center outward, and are not made in a plane, but have their axes in a curved line when seen in section. This gives a great advantage in making the spaces swept over by the pointer sensibly equal for equal increments of pressure. This improvement in the manufacture of disks for this purpose, the invention of the speaker's son was unfortunately not patented, and when it becomes known will no doubt be widely adopted. In general, if we find a gauge with a dial plate so divided that spaces are nearly equal, we may consider that it is fairly good.

In the recording gauge, owing to the very large size of the disks, the travel is very large, amounting to some three sixteenths of an inch in all. The disk is backed or lined by thin annealed brass, which protects it from the action of the water and steam. Phosphor-bronze will answer very well for the same purpose; copper is not so good. With a large travel it needs a comparatively small amount of multiplication to obtain the desired traverse at the end of the pointer. In this case the multiplication fraction is only four or five, while with small diaphragms it is often as much as 18 or even 20. A simple bell-crank gives the pointer its motion, and a long connecting rod carried from the same crank actuates the recording mechanism. A chronometer movement drives a continuous band of paper, on which the record is made. To avoid the difficulties encountered in making a long roll of paper deliver continuously at a fixed rate of speed, provision is made for removing the 24 hours' record at noon of each day.

The speed indicator in some respects seems to be one of the most important instruments needed upon railroads. Described in a few words, it consists of an apparatus like a Pickering governor, which is used to drive the recording apparatus and move a pointer at the same time. The chart or paper is carried by a clock movement. When in operation the apparatus is driven by a V-belt from the shaft of the engine or the driving-axle of the locomotive. Sometimes, when so desired, the speed recorder is provided with a steam gauge also, and the pressure of steam is thus recorded at the same time as the speed.

The induction balance of Prof. Hughes lends itself well to a little piece of conjuring, as was recently shown by M. Hospitalier, at a *soirée* in the Conservatoire des Arts et Métiers. The performer, behind a screen, apparently, which conceals also the main

* I may here note that when a Sprengel pump is available, it would be far better, in point of accuracy and rapidity, to adopt Mr. Parry's plan of measuring the CO_2 instead of weighing it. The apparatus is simpler than that required for a combustion. The details and experiments of this method are described in the *Journal* of the Iron and Steel Institute for 1874.

* Steel for tyres and various forgings.

part of the apparatus, undertakes to tell what coin you drop into a little shallow box. Two inclosed coils round the hollow part of this box are connected with corresponding coils in the concealed portion, which includes also a battery, interruptor, telephone, &c, as in the induction balance. When a coin is dropped into the box, the balance is, of course, disturbed, as the telephone shows. The performer has several coins attached, in a row, to a slip of wood; he pushes each coin for a moment through an aperture between the concealed coils. When silence is established, the coin inserted is the same as that put in the box. If no coin of the collection renders the telephone silent, the coin dropped in the box is probably a foreign or a false coin.

The Iron Production of France in 1880.—In an able review of the French iron trade during 1880, printed in *Iron*, M. Francis Laur, of St. Etienne, gives the following as the production of iron and steel during 1880 compared with 1879, the figures being metric tons:

	1879.	1880.
Forge pig	1,097,124	1,234,704
Foundry pig	303,102	298,398
Iron rails	39,980	41,044
Merchant and profile iron	680,219	754,444
Iron plates	136,872	155,920
Bessemer and open-hearth rails	253,742	279,847
Merchant steel	64,789	86,221
Steel plates	14,934	18,558

The Welland Canal makes a bad beginning. A vessel last week grounded at 10 feet, although a depth of 12 feet was promised and the Toronto *Globe* gives warning that any vessel touching bottom in the aqueduct would probably be lost. As the Montreal *Herald* said a few days ago, the Welland canal is not likely to be of any great service this season. Meanwhile, larger cargoes than ever are going to Europe via New Orleans. As an offset to this last mentioned fact, it is gratifying to know that the increase of West-bound freight on the Erie Canal, since the removal of tolls, is surpassing all expectation. Great quantities of iron ore, which formerly sought transportation westward by way of Ogdensburgh and Lake Ontario, are now resorting to the canal route, and the shipments of molding sand are double what they ever were before. The canal is justifying the confidence heretofore expressed, that a liberal canal policy on the part of New York State will solve some of the most difficult problems relating to the course of trade.

Postmaster-General James issued an order on the 13th inst. directing that sample copies of new publications cannot be mailed in quantities until submitted for a ruling by the department.

Trade Report.

Office of THE IRON AGE,
WEDNESDAY EVENING, May 25, 1881.

It is announced from Washington that the limit of $250,000,000 five per cent. registered bonds which the Secretary offered for the extension at 3½ per cent. has been reached. The extended 6 per cents. are selling freely at 104 @ 104⅛. Stimulated by the success of the scheme for extending the redeemable bonds at a lower rate of interest, the continued liberal demand from abroad for American securities and other indications of monetary ease, the stock market through the week under review has advanced, with some irregularities; reaction in each instance was speedily recovered. Government bonds were strong, large purchases being made for investment, and 6's and 5's advanced 1¼ per cent. The option to extend the 6's of 1881 expired on Friday. State bonds have been irregular, but generally strong, Tennessee issues being the most active. Railroad bonds were strong. A feature on Tuesday was a sale of over $1,000,000 par value, of Boston, Hartford & Erie firsts, closing at 69. The posted rates for bankers' sterling were advanced to $4.85 for 60 days and $4.87 for sight. The demand for commercial paper continues good. We quote 60 to 90 days, indorsed bills receivable, 4 @ 4½ per cent.; good single names, 4 to 6 months to run, 4¾ @ 5½ per cent. Call loans, 2 @ 3½ per cent. The weekly bank statement showed an increase of $1,921,375 in the surplus reserve.

The bank return for the week shows a gain of $1,921,375 in surplus reserve, which now stands at $16,738,575, against $13,919,975 at this time last year, and $5,250,900 at the corresponding period in 1879.

The importations of specie and bullion at this port during the week ending May 21 were $138,910, consisting of $66,888 in gold and $72,022 in silver, as against a total of $248,222 for the week ending May 22 last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1—	
	1881.	1880.
Gold	$28,080,305	$1,259,408
Silver	1,287,251	2,307,981
Total	$29,367,556	$3,567,389
	Since August 1—	
	1880-81.	1879-80.
Gold	$96,359,273	$76,287,380
Silver	3,758,602	5,285,495
Total	$100,117,875	$81,572,875

As above noted, government bonds are strong. Railroad bonds advanced through almost the entire list, the principal changes being as follows:

New York Central, 2; Canada Southern, 2⅜; Western Union, 3½; Northwestern, 4⅝; Northwestern preferred, 3¾; St. Paul, 6; New Jersey Central, 2; Central Pacific, 4¾; Lake Shore, 3⅝; Columbus, Chicago & Indiana Central, 2; Cleveland, Columbus, Cincinnati and Indianapolis, 2¾; Rock Island, 2; Michigan Central, 3; Illinois Central, 2¾; Hannibal and St. Joseph, 5; Hannibal and St. Joseph, preferred, 4½; Northern Pacific, preferred, 4⅜.

It is announced that as soon as legal obstructions to telegraph consolidation are removed, the $80,000,000 capital will be dealt in on the exchanges of New York and London.

The following is an analysis of the bank totals of this week compared with that of last week:

	May 14.	May 21.	Comparison.
Loans	$317,730,900	$324,192,800	Inc. $6,461,900
Specie	76,887,700	80,518,500	Inc. 3,630,800
Legal t'd'rs	17,134,100	17,803,000	Inc. 738,900
Tot. reserve	94,021,800	98,391,500	Inc. 4,369,700
Deposits	310,818,400	326,611,700	Inc. 9,793,300
Reserve required	79,204,600	81,652,925	Inc. 2,448,375
Surplus	14,817,200	16,738,575	Inc. 1,921,375
Circulation	18,596,900	19,135,300	Inc. 538,400

Government bonds at the close were quoted as follows, the market having been strong:

	Bid.	Asked
U. S. 6's 1881 registered	102⅛	—
U. S. 6's 1881 coupon	102⅛	—
U. S. 5's 1881 registered	100¾	—
U. S. 5's 1881 coupon	104⅞	105
U. S. 4½'s 1891 registered	114⅞	115⅛
U. S. 4½'s 1891 coupon	116¼	116½
U. S. 4's 1907 registered	117⅜	117⅝
U. S. 4's 1907 coupon	117⅜	117⅝
U. S. Currency 6s 1895	132	—
U. S. Currency 6s 1896	133	—
U. S. Currency 6s 1897	134	—
U. S. Currency 6s 1898	135	—
U. S. Currency 6s 1899	136	—
"Windom"	104	104¼

MINING STOCKS.

The following were the closing quotations for Mining Stocks:

	Bid.	Asked.
Amie	50	....
Alice	6 75	7.12½
Alta Mont	1.95	2.05
American Flag	25	29
Bechtel	55	....
Bassick	9.75	....
Bonanza C	....	25
Boston C	55	59
Buckeye	12	16
Big Pittsburgh	2.80	....
Bull Dom	2.25	2.40
Bulwer	....	3.20
Boulder C	82	.85
Calaveras	16	17
Cale. B. H	1.65	....
California	1.20	1.25
Climax	65	67
Crescent	....	1.50
Consolidated Virginia	2.25	2.35
Consolidated Imperial	....	28
Consolidated Pacific	71	80
Chrysolite	5.50	....
Catalpa	2.60	2.65
Cherokee	1.70	1.85
Dunkin	....	1.55
Dunderberg	85	1.00
Dahlonega	6	8
Eureka C	32.00	....
Findley	27	....
Fa. Desmet	8.75	9.50
Great Eastern	22	23
Gold Stripe	2.60	2.70
Goodshaw	52	55
G. Prize	....	70
Granville	6	7
Green Mountain	5.62½	5.87½
Hibernia	1.10	1.15
Hukill	1.05	1.10
Hortense	....	50
Iron Silver	1.90	1.95
Lacrosse	35	....
Leadville	1.55	1.60
L. Chief	1.35	1.45
Little Pitts	....	4.30
Mariposa	....	5.25
Mar. Pref	....	7.00
Moose	1.30	....
Moose Silver	1.65	....
Miner Boy	1.15	1.20
Navajo	87	90
North Stan	12	15
Ori. and Mil	3.15	3.20
Plumas	85	1.50
Red Eleph	20	24
Rappah'k	....	20
R. Sun	2.65	2.80
Robinson	10.37½	10.50
South Hite	1.00	1.10
S. Bulwer	....	30
San Pedro	....	4.45
S. Nev	14.75	....
Silver Cliff	5.87½	6.00
Sutro	2.25	2.35
Spr'g Val	3.80	4.00
Tuscarora	26	....
Unadilla	12	....

GENERAL HARDWARE.

The week under review has been rather quiet in the Hardware trade, although manufacturers are very busy on back orders. We hear considerable complaint of scarcity in many lines of goods; this is especially noticeable in Mechanics' Tools, the demand for which has been very heavy and still is active. No changes of importance in values are announced.

Foreign Hardware is in fair request, and stocks of leading goods are reported light, with assortments in many lines broken. Some fair importation orders for Edge Tools and English and German Dividers and kindred goods have been placed during the week.

The demand for Nails is somewhat better this week, but still it is not as active as it usually is during May. The tone of the market is firm at $3.05 @ $3.15, net, for 10d. to 60d., according to quantity.

Sargent & Company give notice that they have reduced the price of Tinned Hammock Hooks to the same list as the Galvanized. The list prices are now as follows:

	Per doz.
No. 57, Galvanized, with Plate	$4.25
No. 58, Tinned, with Plate	4.25
No. 67, Galvanized, with Screw	4.00
No. 68, Tinned, with Screw	4.00

The discounts remain as before.

Durrie & McCarty, Nos. 97 Chambers and 81 Reade streets, have been appointed sole agents for the Barton Bell Co., of East Hampton, Conn. They will carry in stock a full line of their Hand Bells, which they offer to the trade at lowest factory rates.

The manufacturers of Cordage, issued under date of the 21st inst., the following revised price list for Manila and Sisal Rope, showing an advance of ½ cent per pound on Manila and a decline on Sisal of 1 cent per pound. This list is subject to the usual trade discount:

MANILA ROPE.

	Cts. ℔ lb.
1¼ inch cir. and upwards	15
12 thread, or ⅜ diameter	15½
6 and 9 thread, or ¼ and 5-16 diameter	16
Hay Rope, 2, 3, 4 or 5 thread	15
Bolt and Point Rope	16½
Tarred Rope and Lath Yarn	14½
Stave Leather and Hop Twine	15½

SISAL ROPE.

	Cts. ℔ lb.
1¼ inch cir. and upward	10½
12 thread, or ⅜-inch diameter	11
6 and 9 thread, or ¼ and 5-16 diameter	11½
Hay Rope, 2, 3, 4 or 5 thread	10½
Tarred Rope and Lath Yarn	10

We have received the following circular:

CHICAGO, ILL., May 21, 1881.

The American Cutlery Company, of Chicago, take this method of announcing to the trade that their finishing department, containing a large stock of unfinished material, was heavily damaged by fire on the 12th inst. Fortunately the damage on finished stock was merely nominal, so that, with but a slight interruption, we shall in a few days be prepared to fill orders as usual. Thanking the trade for past favors,

We are, yours truly,
AMERICAN CUTLERY CO.

The Penfield Block Company, Lockport, N. Y., have added to their specialties a line of Trucks. We print below their price list and discounts. The discounts from list of Platform Trucks with four wheels, Dry Goods Trucks and Sloping Back Baggage Barrows, have not yet been determined. Illustrations of some styles of these goods appear in their advertisement, on page 28.

TRUCKS.—BOSTON PATTERN TRUCK.

Size.	Length of handles.	Width at nose.	Width at upper bar.	Size of wheels.	Price with wheels outside.	Price with wheels inside.	Price with rubbered wheels.
	Ft. In.	In.	In.	In.			
No. 0.	4 2	11	15¾	6½ x 1½	$5.25	$5.75	$8.00
No. 1.	4 2	11¾	15¾	6½ x 2⅛	5.50	6.00	9.00
No. 2.	4 7	14	18	7½ x 2	6.50	7.25	10.00
No. 3.	4 9	14¾	18¼	9½ x 3¼	9.00	11.00	13.00
No. 4.	5 6	15	19¼	11¼ x 3¼	13.00	.....	17.00
No. 5.	6 1	15⅝	20¼	11¾ x 3¼	14.00	.....	18.00

Discount 20 per cent.

NEW YORK PATTERN TRUCK.

Size.	Length of handles.	Width at nose.	Width at upper bar.	Size of wheels.	Price.
	Ft. In.	In.	In.	In.	
No. 0.	3 6½	12	13¾	6½x1¾	$4.75
No. 1.	4 1	13⅞	15⅝	6½x1¾	5.00
No. 2.	4 5	15	16½	7¾x1⅞	6.50
No. 3.	4 8	16	17¾	8¾x2¼	7.00
No. 4.	5 0	16¼	17¾	9¾x2¼	8.00
No. 5.	5 4	17¼	18⅞	10¾x2¾	9.50

Size.	Pr. strapped up.	Price full ironed.	Pr'e with rub. wh's
No. 0	$5.75	$6.75	$8.00
No. 1	6.50	7.00	8.00
No. 2	8.00	9.50	9.50
No. 3	9.00	10.00	10.50
No. 4	10.00	11.00	11.50
No. 5	11.50	12.75	12.50

Discount 20 per cent.

NEW YORK BARREL TRUCK.

Made either with flat or round slats. Flat are preferable.

Size.	Length of handles.	Width at nose.	Width at upper bar.	Size of wheels.	Prices.
	Ft. In.	Inches.	Inches.	Inches.	
No. 0.	3 6½	12	13¼	6½x1¾	$7.00
No. 1.	4 4	13⅞	15⅝	6½x1¾	7.00
No. 2.	4 5	15	16½	7¾x1⅞	9.50
No. 3.	4 8	16	17¾	8¾x2¼	10.00
No. 4.	5 0	16¼	17¾	9¾x2¼	12.00
No. 5.	5 4	17¼	18⅞	10¾x2¼	13.00

Discount 35 per cent.

COTTON NOSE TRUCK.

	Ft.	In.	Inches.	Inches.	Inches.	Price.
No. 1.	4	1	13⅞	15¾	6½x1¾	$6.75
No. 2.	4	5	15	16½	7¾x1⅞	7.75
No. 3.	4	8	16	17¾	8¾x2¼	9.25
No. 4.	5	0	16¼	17¾	9¾x2¼	10.50
No. 5.	5	4	17¼	18⅞	10¾x2¼	12.00

Discount 30 per cent.

WOOD-SLAT BARREL TRUCK.

	Ft.	In.	Inches.	Inches.	Inches.	Price.
No. 0.	4	2	11	15¾	6½x1½	$6.00
No. 1.	4	2	11¾	15¾	6½x1½	6.50
No. 2.	4	7	14	18	7¼x2	8.00
No. 3.	4	9	14¾	18¼	9½x3¼	11.50
No. 4.	5	6	15	19¼	11¼x3¼	15.00
No. 5.	6	1	15⅜	20¼	11¾x3¼	16.00

STEVEDORE TRUCK.

	Ft.	In.	Inches.	Inches.	Inches.	Price.
No. 1.	4	2	14½	14½	7x1½	$11.00
No. 2.	4	6	15¾	15¾	8x1½	12.00
No. 3.	4	9	16	16	8⅞x2½	15.00
No. 4.	5	0	17	20½	10 x3	18.00
No. 5.	5	3	18	20½	11 x3¼	21.00
No. 6.	6	7	19	20½	12 x3⅜	22.00

Discount 40 per cent.

WESTERN PATTERN TRUCK.

	Inches.	Inches.	Inches.	Inches.	Price.	With rubbered wheels.
No. 1, Half ironed.	47	19	16½	6 x1½	$7.00	$9.50
No. 1, Full "	47	19	16½	6 x1½	8.00	9.50
No. 2, Half "	50	20	17½	7½x1¾	9.00	11.50
No. 2, Full "	50	20	17¾	7½x1¾	10.00	12.50
No. 3	56	22	19	8½x2¼	15.00	17.50
No. 4	60	24	20	9¾x1¾	20.00	23.00

Discount 40 per cent.

PLATFORM TRUCKS WITH FOUR WHEELS.

Size.	Telegraph Name.	Size of Platform.	Price.	Price with rubbered w'ls.
No. 1	Weaving	3 ft. x 2 ft.	$11	$16
No. 2.	Web	3 " 2 in. x 2 ft. 2 in.	12	18
No. 3.	Webster	3 " 4 " x 2 " 4 "	14	20
No. 4.	Wedding	3 " 6 " x 2 " 6 "	15	21
No. 5.	Wedge	3 " 8 " x 2 " 8 "	16	22
No. 6.	Wedlock	3 " 10 " x 2 " 10 "	18	24

Discount —.

BAG TRUCKS.

Size.	Length of handles.	Width at nose.	Width at upper bar.	Size of wheels.	Price.	Price with rubbered wheels.
	Ft. In.	In.	In.	In.		
No. 1.	3 9½	10½	14	5x1¼	$6.00	$8.00
No. 2.	4 0	11¼	14¾	6x1½	8.00	10.00
No. 3.	4 3	12	15½	7x1¾	9.50	12.50

Discount 40 per cent.

CARPET OR HOTEL TRUCKS.

	Price.
No. 1, Iron Wheels; telegraph name, Welsh	$9.00
No. 1. Rubbered Wheels; telegraph name, Westward	12.50

Discount 40 per cent.

DRY GOODS TRUCKS.

Comparatively noiseless. Do not injure the floor. Hung on two large wooden wheels, with one small wooden center wheel at each end for convenience in turning.

	Price.
Size, 3 feet 6 inches by 2 feet wide; telegraph name, Welkin	$16.00

Discount — per cent.

SLOPING BACK BAGGAGE BARROWS.

	Price.
No. 1, 6 feet long by 24 inches wide; telegraph name, Wicked	$33.00
No. 2, 9 feet long by 27 inches wide; telegraph name, Widow	40.00
No. 3, 9 feet long by 30 inches wide, heavy; telegraph name, Wigwam	55.00

Discount — per cent.

BRITISH IRON MARKET.

[*Special Report by Cable to The Iron Age.*]

LONDON, May 25, 1881.

Scotch Pig.—There is a marked improvement in the demand, and a fair business has been done during the week. Prices, however, are weaker, and there is a reduction of 6d. on all brands quoted. The following are to-day's prices:

Gartsherrie, alongside, Glasgow			56/
Coltness	"	"	56/
Glengarnock	"	Ardrossan	51/6
Eglinton	"	"	46/6

Lighterage from Ardrossan to Glasgow is 2/@ 2/6 per ton.

Manufactured Iron.—The market is without change to note, prices ruling weak under the light demand. Best Staffordshire Bars, nominally, £7.

Steel Rails.—The market is quiet, with a fair business doing. Ordinary sections are quoted, nominally, £6 @ £6. 10/.

Iron Rails.—There is very little business doing. We quote Welsh, nominally, £5. 5/ @ £5. 10/.

Old Rails.—Nothing doing.

Scrap.—Wrought is quoted at £3.

IRON.

American Pig.—There is no improvement to notice in the tone of the Iron market, which continues in the dull and apathetic condition that has characterized it for some months. No sales worthy of mention are reported, and in view of the fact that there is no abatement in the consumption, this condition of affairs is the subject of much comment and is difficult to explain. Furnacemen continue to make heavy deliveries on contracts made early this year, but the new orders they are receiving are, for the most part, of a hand-to-mouth character. We repeat former quotations, viz.: Foundry No. 1, $24 @ $25; Foundry No. 2 X, $22; Gray Forge, $20.

Scotch Pig.—Sales are reported of 200 tons Eglinton, on the spot, and 300 tons Glengarnock, to arrive, both on private terms; also, 100 tons Coltness at $23, prompt cash. The tone of the market is weak, and although quotations are unchanged, they could without doubt be shaded for a fair-sized order. We quote: Eglinton, $21.50; Carnbroe, $22; Coltness, $23.50 @ $24; Glengarnock, $22.50; Gartsherrie, $22.50 @ $23.

A sale of 2000 tons Bessemer Pig at $22.50, to arrive, is reported.

Rails.—No new business either in Steel or Iron Rails is reported. We quote Steel at mill, $56 @ $60, and Iron Rails, $48 @ $50.

Old Rails.—A sale of 500 tons Double Heads at $27, and 500 tons Ts, said to be at a very low figure, is announced. The inquiry is light. We quote, nominally, $26.50 @ $27.50 for Ts and D. H., respectively.

Scrap.—We quote No. 1 Wrought, $28 @ $30.

METALS.

Copper.—There has been nothing doing during the week and the market remains quiet to the close, holders asking 18¾¢ @ 18⅞¢ for Lake Superior, while Baltimore may nominally be quoted 18½¢ @ 18¾¢. Manufacturers hesitate, awaiting further developments, the first boat having left the lakes on the 18th instant and being now about due. Export shipments figure up to date, 2,930,000 pounds. The cable reports no change in the London market. Advices have come to hand from Andalusia, Spain, giving particulars of the output of the Rio Tinto Mining Co. in 1880 as compared to the previous year. The ore and Copper production of the mine has varied little from 1879, but the net earnings have nevertheless been better, enabling the Company to declare a dividend of 8%, instead of 5% in 1879. By the last mail from Europe we hear that the king of the Netherlands has offered to the belligerents on the Pacific his mediation. Meanwhile, the new Parliament of Peru has met (on May 15), and in some shape or another a suitable agreement with Chili will not unlikely be arrived at, enabling the latter to withdraw the bulk of her army and restore hands to the Copper mines. "London, May 7.—The statistics for last month are extremely unfavorable, since they show an increase in the total visible stock of no less than 3128 tons. This has necessarily had a very depressing influence upon the bar market, and created a stronger desire to realize, and in consequence prices have receded to the extent of 20/ or 30/ per ton. The total public stock on the 1st inst. was 61,685 tons, against 58,557 tons on April 1. This increase can hardly be reckoned one of surprise, for it will be remembered that the charters from Chili last month were somewhat heavy and above the usual average, while consumption must have been to some extent retarded by the advance which was made in the price of manufactured, which checked orders for that description, thereby necessarily reducing smelters' requirements of the raw material." Manufactures remain as under: Bottoms, 20¢; Braziers, according to size, 28¢ @ 34¢; Circles, 31¢ @ 34¢; Segment Sheets, 31¢; Fire-box Sheets, 28¢; Sheathing, 26¢, and Bolt Copper, 28¢.

Tin.—Our market has not shown any material change, although prices have declined a little. Consumption is going on well here and the visible supply decreases regularly. London cables to-day, Straits Tin, on the spot, £86. 10/, and that "deliveries are proceeding satisfactorily, causing holders to evince greater firmness." Singapore cables $27 per picul. A well-informed London firm writes to its correspondent this month that in its opinion Tin will rise £5 to £10 per ton as soon as the least speculative feeling manifests itself. The market closes heavy at New York at 20¢, nominally, for all sorts, large lines. "London, May 7.—The total deliveries last month in London and Holland were 1803 tons, against 1918 tons in March and 1719 tons in April, 1880. The total visible stock on the 30th ult. amounted to 14,299 tons, compared with 14,780 tons on March 31 and 13,401 tons on April 30, 1880. Another satisfactory feature is the further reduction which has been effected in the stocks in American ports, that, including the quantity afloat, amounting on the 30th ult. to 2940 tons, against 3294 tons on the 31st of the previous month and 7850 tons on April 30, 1880. It is a very favorable sign to see the stocks on that market constantly being reduced, as, if continued, it indicates a repetition of orders from America, which would probably give great support to the market here, and possibly lead to the establishment of improved prices." *Tin Plates.*—There is a dull market; stocks here would not be considered heavy if matters were going on half-way smoothly, but as things are flat and as stocks have consequently been increasing a little during the month, these supplies weigh down prices, which we quote toward the close, large lots, ordinary brands, per box: Charcoal Bright, $5.87½ @ $6; ditto Ternes, $5.37½ @ $5.50; Coke Tin, $4.90 @ $5, and ditto Ternes, $4.80 @ $4.90. Stocks at Liverpool continue increasing, and in Wales they are working at a greater loss than ever before, for, although iron has not yet reached the low point of 1879, when Tin Plates reached to their lowest ebb, Tin is still £30 above rates then current. If it is remembered that it takes 6 pounds of Tin for every box of Tin Plates, it will be seen that this makes a difference of nearly 50¢ per box.

Lead—Has been dull; 100 tons sold at 4½¢, and later on a few hundred tons at 4⅜¢, Common Domestic closing at 4⅜¢ @ 4½¢. This depression is attributable to too much pressure to sell, although it is claimed by some parties that the movement is speculative. At St. Louis Common Lead commands 4⅛¢. Here nothing has transpired in Refined Lead. We quote the same $4.70 @ $4.75; at St. Louis it is worth $4.30. "London, May 7.—Business is quiet and much restricted, while prices continue at a very low range, which appears to have no beneficial influence whatever upon the demand. The export trade is particularly inanimate, but a limited number of inquiries only being received for any description." Manufactures are quoted as follows: Sheet Lead, 7¢; Lead Pipe, 6½¢; Tin-lined ditto, 15¢, and Block Tin Pipe, 40¢.

Spelter and Zinc.—The same quiet state of affairs hitherto noticeable prevails. We quote Common Domestic 4¾¢, and Best Missouri 5¢, at which rate sales are effected. Silesian is worth 5¾¢ @ 5½¢. "London, May 7.—This market continues to be characterized by a quiet tone, buyers apparently limiting their orders only to immediate requirements. Prices are without material change, either for foreign or English."

Antimony.—While the jobbing trade is good, nothing transpires in a wholesale way to speak of. We leave quotations unchanged —14¼¢ @ 14½¢, as to brand.

COAL.

The Coal trade is moving along in a humdrum sort of way, without any special animation or hopefulness. In hard Coals, the orders received are sufficient to absorb the whole amount produced, excepting one or two special sizes, and there are some indications of heavy buying. Taking all together, a fair business is doing. In free-burning Coals, it is difficult to disguise the fact that the course of things is less satisfactory, and among outside operators there is supposed to be more or less cutting of prices. In the general market, however, prices are well maintained. Before the close of this week something definite will be agreed upon respecting the prices for June, and whether mining shall be prosecuted on whole time or not. At present, there is much divergence of opinion, with an apparent leaning in favor of a restricted production.

Bituminous Coals are unchanged, though it is said that manufacturers are waking up to the advantages of burning Bituminous Coals at present prices. Cumberland and Clearfield are quoted as heretofore—$4.85 at New York to the trade—which is usually about 10¢ lower than to consumers.

Anthracite is quoted $3.90 for Lump and Grate, $4.05 @ $4.20 for Egg and Stove, and $3.90 @ $4 for Chestnut. Lehigh proper is $5 for Lump and $4.25 @ $4.35 for most of the other sizes.

The total tonnage of Anthracite Coal from all the regions for the week ending May 14 amounted to 414,269 tons, against 388,904 tons in the corresponding week last year. The total amount of Anthracite mined for the year is 9,018,295 tons, against 7,619,916 tons for the same period last year, an increase of 1,308,879 tons. The quantity of Bituminous Coal sent to market for the week amounted to 103,147 tons, against 88,279 tons in corresponding week last year. The total amount of Bituminous mined for the year is 1,704,930 tons, against 1,361,632 tons for the corresponding period last year.

The scarcity of vessels continues. To Boston the rate is $1.15 @ $1.20 from Hoboken, and $1.20 @ 1.25 from South Amboy, according to size.

FOREIGN TRADE MOVEMENTS.

The following is a summary of the foreign trade movements for the week:

IMPORTS.

For the week ended May 21:

	1879.	1880.	1881.
Total for week	$5,647,466	$11,078,699	$8,928,436
Prev. reported	115,200,436	190,085,708	159,221,722
Since Jan. 1	$120,847,902	$201,764,467	$168,750,658

Included in the imports of general merchandise for the week were articles valued as follows:

	Quantity.	Value.
Anvil's	50	$344
Brass goods	31	2,352
Bronzes	34	7,133
Chains and anchors	57	4,573
Clocks	20	2,911
Cutlery	74	21,350
Pins	7	1,519
Guns	83	14,612
Hardware	17	1,297
Iron, pig, tons	7,910	171,161
Iron, sheet, tons	37	4,225
Railroad bars	19,528	96,893
Iron ore, tons	8,879	30,649
Iron, other, tons	1,674	59,293
Lead, pigs	800	5,457
Machinery	111	5,705
Metal goods	298	15,292
Nails	1	171
Needles	2	1,740
Nickel	14	4,313
Old metal	..	21,241
Platina	1	2,444
Platedware	2	274
Percussion caps	11	2,571
Saddlery	6	552
Steel	13,620	102,706
Spelter	220,976	8,230
Silverware	8	716
Tin, boxes	30,800	144,275
Tin, 2196 slabs	176,358	36,645
Wire	233	3,850
Copper	..	19,789

The following are the imports of leading articles, compared with previous dates:

	For the week.	20 weeks of 1881.	Same time 1880.
Cutlery, pkgs	74	2,842	4,088
Hardware, pkgs.	17	477	562
Iron, R. R., bars.	19,528	113,354	190,212
Lead, pigs	800	12,936	30,687
Steel, pkgs	13,620	134,046	214,800
Tin, boxes	30,800	578,585	686,619
Tin Slabs, lbs	176,358	6,067,355	15,051,652

EXPORTS OF SPECIE.

For the week ended May 21:

Total	$167,300
Previously reported	4,488,788
Total since January 1, 1881	$4,656,083
Same time in 1880	3,472,967
Same time in 1879	8,215,890
Same time in 1878	7,801,576
Same time in 1877	14,797,274
Same time in 1876	24,199,017
Same time in 1875	33,474,344
Same time in 1874	24,099,780
Same time in 1873	20,304,817
Same time in 1872	22,474,157

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended May 24:

	1879.	1880.	1881.
For the week	5,607,932	$8,859,558	$7,077,845
Prev. reported	115,426,303	133,800,245	140,218,378
Since Jan. 1	$121,124,235	$142,659,803	$147,326,223

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending May 24, 1881:

Article	Quan.	Val.
Hamburg.		
Ptlm., gals	763,121	$61,840
Clocks, bxs	158	2,308
Tubes, case	1	75
Mach'y, pkgs.	45	6,404
I. pipe, pcs	1372	4,163
Mf. iron, pkgs	22	715
Tinplates, bxs.	51	264
Sew. ma., cs.	245	4,000
Ag. imp., pkgs	15	270
Hdw., cs.	116	1,987
Arms, cs	4	237
Valves, cs.	23	820
Wringers	13	470
Danish West Indies.		
Iron, pkgs.	185	531
Mf. iron, pkgs.	427	507
Ptlm., gals.	300	39
Tin, bxs.	4	26
Nails, bxs.	18	78
Arendal.		
Ptlm., gals.	126,810	10,149
Bremen.		
Ag. imp., pkgs.	41	1,930
Hdw., pkgs.	5	80
Rotterdam.		
Hdw., pkgs.	4	160
Dutch West Indies.		
Ptlm., gals.	1323	149
Hdw., pkgs.	5	56
Dutch East Indies.		
Ptlm.. gals.	285,000	33,000
Bergen.		
Ptlm., gals.	134,242	11,075
Christiana.		
Ptlm., gals.	86,080	6,932
Kastrup (Den.)		
Ptlm., gals.	199,651	16,350
Stralsund.		
Ptlm., gals.	288,265	23,212
Pillau.		
Ptlm., gls.	250,949	21,000
Antwerp.		
Hdw., cs.	8	650
Liverpool.		
Radiators, cs.	15	375
Rifles, cs.	51	10,850
Ag. imp., pkgs	2	75
Shears, case.	1	825
Brass caps, cs	146	12,000
Mach'y, pkgs.	10	1,450
Clocks, bxs.	98	2,960
Hdw., cs.	71	2,859
Ptlm., gals.	746,563	63,248
Brass, cs.	41	4,500
Brass gds., cs.	11	750
Revolvers, cs.	2	642
Ore, pkgs.	15	1,050
Bristol.		
Mach'y, pkgs.	3	800
Newcastle.		
Ptlm., gals.	118,200	10,150
Limerick.		
Ptlm., gals.	83,251	7,488
London		
Ag. imp., pkgs.	72	3,433
Hdw., cs.	639	14,002
Clocks, bxs.	113	2,391
Sew. mach., cs	695	21,196
Cars	3	2,925
Mf. iron, pkgs.	28	1,649
Cutlery, cs.	6	535
Mach'y, cs.	9	1,550
Hull.		
Hdw., cs.	4	92
Ag. imp., pkgs	178	5,582
Spelter, slabs	1,302	4,000
British Guiana.		
Ptlm., gals.	11,419	1,453
Hdw., pkgs.	6	57
Nails, kegs.	30	71
British East Indies.		
Ptlm., gals.	495,000	60,119
Cuba.		
Sew. ma., cs.	85	2,458
Hdw., pkgs.	310	4,050
Clocks, case	1	44
Mach'y, cs.	2	35
Mf. iron, pkgs	87	926
Iron, pkgs.	81	378
Ptlm., gals.	19,500	2,498
Nails, kegs.	214	702
Burial case	1	52
Iron safe	1	30
Tacks, cs.	6	234
Tin, bxs.	7	182
Cutlery, cs.	2	44
Pumps, pkgs.	4	95
Ag. imp., pkgs.	55	961
Nails, bxs.	38	234
French West Indies.		
Ptlm., gals.	9500	1,245
Barcelona.		
Pistols, cse.	1	260
RR. cars	15	46,500
Ptlm., gals.	197,377	16,797
Mf. iron, pkgs.	2	40
Presses	3	187
Hdw., cs.	7	260
Clocks, cs.	2	140
Locomotives	3	29,750
Trieste.		
Ptlm., gals.	168,861	13,500
Odessa.		
Ptlm., gals.	110,000	15,300
Syria.		
Ptlm., gals.	120,000	12,900
Central America.		
Ptlm., gals.	20,900	2,826
Sew. ma., cs.	12	340
Mach'y, case	1	65
Clocks, bxs.	4	96
Mf. iron, pkgs	40	182
Constantinople.		
Ptlm. gals.	149,033	16,000
Seville.		
Ptlm., gals.	199,000	22,000
Porto Rico.		
Mf. iron, pkgs.	51	474
Mach'y, cs.	5	800
Pumps, box	1	27
Hdw., cs.	41	435
Ag. imp., pkgs	34	325
Fire engine	1	250
Ptlm., gals.	2960	376
Rifles, case	1	48
Nails, pkgs.	65	216
Steel, bars	3	25
Mexico.		
Mf. iron, pkgs.	132	1,212
Steam launch	1	2,000
Mach'y, pkgs.	125	11,843
Ag. imp., pkgs	39	463
Revolvers, cs.	2	622
Clocks, cs.	3	67
Tin, cs.	2	252
Sew. mach., cs	50	1,611
Ptlm., gals.	6200	812
Hdw., cs.	249	3,248
Needles, cse	1	190
Brass gds., pgs	52	6,803
Hayti.		
Still	1	134
Hdw., cs.	28	333
Cutlery, cse.	1	25
Mf. iron, pkgs	12	115
Ag. imp., pkgs	5	155
Ptlm., gals.	7330	972
Nails, kegs.	119	382
Argentine Republic.		
Clocks, bxs.	44	$2,526
Tacks, cs.	52	221
Revolvers, cse	1	620
Nails, bxs	230	960
W. mach., pkg	12	136
Ag. imp., pkgs	517	7,286
Hdw., cs.	226	4,345
Ptlm., gals.	37,000	4,485
Mf. iron, pkgs.	10	559
Lussinpiccolo.		
Ptlm., gals.	136,801	11,750
Cardiff.		
Mf. iron, pkgs	2	58
Glasgow.		
Car wheels	100	900
Ag. imp., pgs.	225	39,49
Mf. iron, pgs.	8	416
Scales	1	95
Sew. ma., cs.	8	150
Hdw., cs.	2	40
Gibraltar.		
Ptlm., gals	133,490	15,354
Clocks, bxs.	4	120
Hdw., case	1	117
Bordeaux.		
Copper, cks.	90	18,000
Dunkirk.		
Ptlm., gls.	189,232	11,352
Rouen.		
Ptlm, gls.	246,177	14,800
British North American Colonies.		
Mf. iron, pkgs.	13	220
Mach'y, pkgs.	2	121
Bell	1	104
Car springs	200	312
Nails, pkgs.	7	46
Clocks, bxs.	33	294
Pumps, pkgs.	2	87
Ptlm., gals.	11,546	1,281
Per. caps, cs.	4	200
Hdw., pkgs.	63	601
Pig iron, tons.	460	9,650
British Possessions in Africa.		
Ag. imp., pkgs	179	4,697
Mf. iron, pkgs	33	405
Hdw., cs.	285	773
British West Indies.		
Ptlm., gals.	25,686	3,185
Carriage	1	100
Hdw., cs.	36	544
Nails, kegs	12	55
Mf. iron, pkgs	96	508
Sew. ma., cs.	4	32
British Australia.		
Hdw., pkgs.	840	17,682
Steel gds., cs.	8	162
Sew. ma., cs.	235	6,452
Nails, cs.	24	572
W. mills, cs.	12	120
Petlm., gals.	38,800	5,517
Ag. imp., pgs.	1,066	30,651
Mf. iron, pkgs.	35	577
Mach'y, cs.	9	527
Clocks, bxs.	191	2,466
Wringers	18	583
Pumps	15	999
Cutlery, cs.	281	3,480
Wire gds., cs.	8	464
Brass tubes, cs	116	11,915
RR. mtls., pgs	14	2,036
Firearms, cse.	1	35
United States of Colombia.		
Clocks, cs.	11	179
Pumps, pkgs.	11	551
Iron, pkgs.	118	1,166
Ag. imp., pkgs	23	806
Tinware, pkgs	3	69
Cartridges, cs	154	2,680
Locomotive	1	5,525
Nails, kegs.	3	46
Zinc, casks	7	507
Per caps, cse.	1	23
Arms, cases	6	424
Bells, pkgs.	6	156
Brass cocks, cs	12	108
Petlm., gals.	7,030	1,002
Hdw., pkgs.	262	8,248
Sew. ma., cs.	175	5,388
Cutlery, cs.	181	3,862
Mf. iron, pkgs	369	6,326
Mach'y, pkgs.	227	10,826
Revolvers, cs.	6	131
Lead pipe, ft	3,047	224
Nails, kegs.	56	248
Wire cloth, pgs	19	313
Venezuela.		
Mach'y, cs.	92	4,075
Mf. zinc, cs.	2	31
Hdw., cs.	3	72
Sew. ma., cs.	23	372
Nails, kegs.	5	25
Petlm., gals	29,940	3,535
Mf. iron, pkgs	144	1,038
Cutlery, cs.	4	232
Ptg. mtls., pgs	3	155
Iron safe	1	129
Ag. imp., pkgs	48	60
Clocks, box	1	17
Africa.		
Iron, bdls.	40	120
Mf. iron, pkgs	3	55
Pumps, pkgs.	3	75
Tanks	12	75
Ptlm., gals.	306,250	36,119
Nails, kegs	34	179
Iron safe.	1	100
Clocks, cs.	70	1,008
Brazil.		
Ptlm., gals.	288,964	35,214
Hdw., pkgs.	752	10,354
Mf. iron, pkgs	355	4,076
Clocks, pkgs.	42	836
Sew. ma., cs.	37	676
Shoe nails, cs.	25	124
Rifles, bxs.	5	143
Pistols, cse.	1	120
Cartridges, cs.	3	75
Nails, bxs	2	20
Wire gds, cs.	10	115
Ag. imp., pgs.	28	1,550
Cutlery, cs.	138	5,960
Pumps	12	720
Nails, kegs.	300	934
Guns, cs.	4	185
Irons, cs	110	615
Uruguay.		
Clocks, pkgs.	66	1,262
Mf. iron, pkgs	6	110
Ag. imp., pgs.	217	3,695
Petlm., gals.	30,000	3,600
Car wheels	50	550
Nails, pkgs.	26	437
Hdw., pkgs.	122	2,105
Sew. ma., cs.	5	67
Mach'y, cs.	2	1,900
Galway.		
Ptlm., gals.	278,225	23,200
Ecuador.		
Petlm., gals.	10,000	1,150
Hdw., cs.	34	553
Pistols, cse.	1	129
New Zealand.		
Mf. iron, pgs.	11	190
China.		
Hdw., cs	11	155
Nails, kegs.	2,350	1,207
Ptlm, gals.	488,690	55,272
Rifles, case	1	60
Cartridges, cs	5	64
Havre.		
Hdw., cs	2	89
Ag. imp., pgs.	167	17,637
Copper, cks.	270	54,000
Mf. iron, pgs.	3	29
Iron drums	72	1,440
Sew. ma., cs.	254	3,616

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending May 25, 1881:

Hardware.

Alexandre F. & Sons, Ironware, cs., 2
Baker & Hamilton, Gun caps, cs., 12
Boker, Hermann & Co. Cutlery, cs., 13; Guns, cs., 73; Chains, cks., 17; Cases, 4
Barbour Bros. Machinery, cs., 9
Birbecker J. Case, 1
Bloomfield J. C. & Co. Castings, 12; Machinery, pkgs., 44; Pipe, pkgs., 10
Brockner & Evans, Galv'd wire netting, bdls., 108
Calhoun, Robbins & Co. Pins, cs., 3
Cazaux H. Builder projections, box, 1
Dolge Alfred, Machinery, cs., 2
Drexel, Morgan & Co. Arms, cs., 73
Duval H. R. Cases, 6
Elwell J. W. & Co. Old anchor, 1; Cable chains, 2
Field Alfred & Co. Cases, 10; Packages, 7
Folsom H. & D. Arms, cs., 2; Packages, 6
Frasse P. A. & Co. Cases, 6
Graef Cutlery Co. Cases, 4
Hartley & Graham, Arms, cs., 22; Packages, 4
Howard Bros. & Read, Cases, 3
Hoe R. & Co. Cases, 2
Kamak Cutlery Co. Case, 1
Kaufmann A. Finger bars&knives, case, 1
Lamarche H. Arms, cs., 2
Matthiessen F. O. & Wilchers, Machinery, cs., 5
Merchants' Dis. Co. Arms, cs., 5
Meyer H. A., Jr. Cases, 3; Bales, 5; Bundles, 88
Moore's J. P. Sons, Cases, 4
Rogers Henry, Cases, 2; Packages, 1
Sellers W. B. Cases, 3
Schuyler & Duane. Arms, cs., 7
Struller, Lau & Co. Arms, cs., 6
Snelling J. & Co. Iron pump, 1
Schoverling, Daly & Gales, Cases, 26
Stearns J. N. & Co. Machinery, case, 1
Sackrenter Chas. Machinery, cs., 2
Smithers H. W. Electric machine, box, 1
Troy Laundry Co. Machinery, cks., 2
Taylor Thos. Packages, 2
Tiffany Chas. L. Cases, 3
Tillotson L. G. & Co. Wire, lots, 797
Ward Asline, Case, 1
Wiebusch, Hilger & Co. Anvils, 200; Cutlery, &c., 72
Winchester Arms Co. Case, 1
Windmuller & Roelker, Arms, cs., 6; Packages, 4
Witte John G. & Bro. Cutlery, cs., 9; Case, 1; Pins, cs., 2
Woodcock H. Printing machinery, pkgs., 10
Order, Cases, 4; Locomotive axles, 2; Lawn mow., crates, 8; Fencing wire, spools, 200; Machinery, case, 1; Gun barrels, cs., 4; Guns, cs., 6; Bicycle fittings, cs., 1; Rivets, cs., 19; Wedges, cks., 12

Iron.

Baring Bros. & Co. Wire rods, coils, 355; Wire rods, bdls., 1093; Nail rods, bdls., 1925
Brown Bros. & Co. Bars, 2442
Bliss E. W. Pig, tons, 75
Coddington T. B. & Co. Sheets, bxs., 64; Sheets, bdls., 222
Crocker Bros. Pig, tons, 800
Drexel, Morgan & Co. Ore, tons, 260
Elliott, Sons & Co. Ore, tons, 350
Lillienberg N. Pig, pcs., 76
Mason J. W. & Co. Wire rope, coils, 14
Mich. Cent. R. R. Co. Rails, 1165
N. Y. Cent. R. R. Rails, 3679
Olsen & Co. Ironwork, bxs., 4
Phelps, Dodge & Co. Sheet iron, bdls., 208; Pig, tons, 345
State Savings Association, Rods, pkgs., 6310
Lundberg Gust. Bars, 8446
Whitney A. R. Iron tubes, 457
Williamson Jas. & Co. Pig, tons, 400
Order, Pig, tons, 1157; Ore, tons, 8550; Old scrap, lot; Old scrap, tons, 384; Black copper, pigs, 165; Swedish wrought, bars, 1040; Swedish pig, lot; Swedish pig, tons, 100; Bars, 7478; Speigeleisen, lots, 2; Speigeleisen, kilog., 166,392; Spiegeleisen, tons, 709; Old rails, tons, 443; Rails, 250; Rail ends, tons, 500; Rods, 8207; Rods, bdls., 723; Wire rods, coils, 832; Wire rods, bdls., 981; Plate, 1

Steel.

Abbott Jere. & Co. Cases, 21; Wire ends., pkgs., 48
Baring Bros. & Co. Blooms, 787
Brown Wm. Bundles, 192; Case, 1
Carey & Moen, Casks, 10; Steel rods, 329
Drexel, Morgan & Co. Blooms, 1980; Steelware, cs., 10
Duval H. R. Steel bands, 538; Cases, 3
Lee James & Co. Blooms, 708
Moss F. W. Bundles, 76; Bars, 27
State Savings Association, Rods, bdls., 1858
Woodford W. O. Bundles, 330; Bars, 50; Cases, 13
Order, Blooms, 5701; Bars, 31; Spring steel, bdls., 8; Old spring, tons, 99; Old steel, pkgs., 98; Old steel, lot, 1; Bundles, 178; Bundles for Canada, 99; Cases, 19; Casks, 5; Rods, bdls., 165; Tubes, 450; Old rails, tons, 15; Forgings, 48

Metals.

Bank of Montreal, Tin plates, bxs., 1614
Behm, Meyer & Co. Tin, slabs, 1436
Byrne Jos. & Co. Tin plates, bxs., 1200
Coe Brass Mfg. Co. Old brass, bbls., 183
Coddington T. B. & Co. Tin plates, bxs., 82
Cort N. L. & Co. Tin plates, bxs., 1000
Elwell J. W. & Co. Copper, cask, 1; Hogshead, 1; Brass, bbl., 1
Mayer G. A. & E. Oxide zinc, bbls., 200
Noel A. Tin plates, bxs., 8
Oleo Miguel, Leaf tin, cs., 9
Phelps, Dodge & Co. Tin plates, bxs., 4736
Stevenson, Pierson & Co. Sheathing metal, cs., 100
Windmuller & Roelker, Sheet zinc, cks., 150
Order, Black copper, bars, 162; Tin plates, bxs., 19,614; Gray zinc powder, cks., 6; Copper, ingots, 2375; Ingots, 514; Scrap metal, ingots, 128; Tin, ingots, 1200

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	₽ lb.	$0.16	@	$0.17
Copper Bottoms	"	.14	@	.14½
Yellow Metal	"	.09	@	.09½
Brass, heavy	"	.11½	@	.12½
Brass, light	"	.09	@	.09½
Composition, heavy	"	.13½	@	.14½
Lead, heavy	"	.03¾	@	.04
Tea Lead	"	.03¼	@	.....
Zinc	"	.03½	@	.03¾
Pewter, No. 1	"	.13	@	.13½
Pewter, No. 2	"	.08	@	.09
Wrought Iron	₽ ton	22.00	@	23.00
Light do.	"	9.00	@	10.00
Stove Plate	"	10.00	@	10.50
Machinery do.	"	15.00	@	16.00
Grate Bars	"	5.00	@	6.00

The prices current for Rags, &c., are as follows:

Canvas, Linen	₽ lb.	3½c.	@	4 c.
White Cotton, New	"	3½c.	@	.....
" " No. 2	"	2½c.	@	.....
White, No. 1	"	4½c.	@	4¾c.
" No. 2	"	2½c.	@	2¾c.
Seconds	"	1 c.	@	1½c.
Soft Woolens	"	8½c.	@	9½c.
Mixed Rags	"	2c.	@	2½c.
Gunny Bagging	"	1¾c.	@	.....
Jute Butts	"	2c.	@	2¼c.
Kentucky Bagging	"	3¾c.	@	4 c.
Book Stock	"	2½c.	@	2¾c.
Newspapers	"	1½c.	@	1¾c.
Waste Paper and Scraps	"	½c.	@	¾c.
Kentucky Bale Rope	"	4c.	@	.....

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, May 24, 1881.

Pig Iron.—The market remains without important change, although there is a good deal of the feeling of dullness and uncertainty which we have alluded to in our late reports. Prices are easy—in some cases decidedly weak—but there has not been sufficient business done to warrant any general change in quotations. It is difficult to predict what the ultimate outcome will be, but the most experienced men in the trade express the opinion that there can be no great change in either direction. The very large quantities of Bessemer Iron which are being imported, and which are offered at steadily declining prices, is regarded as an unfavorable feature, and is exercising a most depressing influence on all other grades of Pig Metal. Arrivals during the past 30 days have been very heavy, and as contracts have just been closed for large lots additional, furnace men begin to regard the matter as one of serious importance. Consumption of all grades is very large, however, and as stocks in yards are said to be running low, a steady demand is likely to set in almost immediately. Inquiries are unusually numerous, and bids for large lots not difficult to obtain at moderate concessions from asking prices. The margin is already too small to permit of further reduction, however, and unless contracts can be renewed at about present prices, it is likely that a good many furnaces will go out of blast. Transactions during the week have been of an irregular character, large lots having been taken only when special inducements were offered, and small lots at current rates, to tide over until prices become more settled. Lots of 1000 tons each have been placed at about $19 at furnace for Gray Forge and $23 for No. 1 Foundry, and in some cases lower rates for the latter grade. Purchases could be duplicated without difficulty at the prices named, but consumers manifest a disposition to hold off as long as possible, under the impression that if prices are not lower they are certainly not likely to be dearer by the time their stocks require replenishment. As we have intimated before, the time is probably not far distant when the market will assume some more definite character than it now has. Contracts for the last half of the year will have to be renewed, and a good deal will depend upon the prices agreed upon for leading brands of Mill Irons. There is undoubtedly a strong preference for certain leading brands, even at comparatively high prices, but it will be difficult to hold consumers to the rates now current; the feeling developed during the week seems to be that a reduction will have to be made or attention turned to other good, but less known and much cheaper, brands. The large transactions in Middlesboro Iron, at about $17 @ $17.50, and other low-priced Irons are having their effect. The weakness in Old Rails and Scrap Iron is another element in favor of lower prices, so that, after a review of the whole field, the market at this date appears to be somewhat less favorable to sellers than it was a week ago. Sales reported are as follows: No. 1 Foundry at $24 @ $25, up to $26 for one or two very choice brands; No. 2 at $22, and Gray Forge at $20 @ $22. Bessemer Iron has been sold in large lots at about $23, with that figure bid for 10,000-ton lots of choice brands; others available at slightly lower prices.—Foreign Charcoal Iron has been sold in lots of several hundred tons each, but exact quotations are not obtainable. The range of prices are from $28 to $38, according to braud, the latter figure for a few choice lots only.

Blooms.—There is a fair demand and sales not difficult to make at about the following quotations for best qualities: Cold-blast Charcoal, $62.50 @ $65; Run-out Anthracite, $55; Scrap Blooms, $45 @ $47.50.

Muck Bars.—There is a fair demand and holders are firm, but buyers are unwilling to meet the advance which is generally asked. For good quality $38.50 at mill is quoted, but sales have not been of much importance, although at $38 buyers would take hold with some freedom.

Structural Iron.—Business shows some little improvement, and manufacturers report a slight but steady accumulation of orders. Nothing of special importance has been developed during the week, but orders from bridge builders have been a little larger than usual, besides a like increase from some of the shipyards. Both these important interests have a large amount of work on hand; every establishment, in fact, so far as we can learn, is full to its utmost capacity, and can scarcely look at a new order inside of from three to six months. This insures a good demand for shaped Iron, and the only complaint we hear is that prices of some kinds are rather too low. Angles are quoted 2.6¢; Tees, 3¢; Beams, 3.3¢, and Channels, 3.4¢.

Bar Iron.—There has been nothing new to change the report of last week. The demand is moderately active, but complaints in regard to prices prevail as usual. The majority of the mills are kept fully employed in meeting the current demand, but orders for large lots are very scarce. Manufacturers in the interior appear to be relatively in a better position than the city mills, the local demand being very heavy, while the seaboard markets are overweighted by shipments from any who may feel the necessity of unloading their surplus. Prices are kept very steady, however, and 2.35¢ @ 2.4¢ at mill appear to be the ruling rates for Refined Iron, although 2.25¢ @ 2.3¢ is mentioned for other descriptions.

Plate and Tank Irons.—A larger business is reported, and the majority of the mills have as much work on their hands as they care to undertake. A heavy demand is reported for Tank Iron, although orders have been chiefly placed at Western mills, and there has been nothing of an urgent nature so far as this market is concerned. It is understood, however, that business could be obtained at about 2.65¢ @ 2.7¢, but as a rule manufacturers are firm at 2.75¢. The demand for small lots is quite active, which, with previous contracts to complete, places manufacturers in a comfortable position. Quotations are unchanged as follows: 2.75¢ for Tank; Refined Iron, 3.25¢; Shell, 3.50¢; Flange, 4.50¢ @ 4.75¢; Fire-box, 5.50¢ @ 5.75¢.

Sheet Iron.—The demand is fair and prices steady. The mills have an abundance of orders to complete, and there is no special desire to obtain new business. Large buyers are able to obtain favorable terms, however, but in ordinary transactions prices are as last quoted, viz.:

Common Sheet, No. 26 to 28	4¼¢
Common Sheet, No. 22 to 25	4 ¢
Common Sheet, No. 16 to 21	3¾¢
Best Refined ¼¢ @ ½¢ advance on the above.	
Best Bloom Sheets, No. 26 to 28	6¾¢
Best Bloom Sheets, No. 22 to 25	6½¢
Best Bloom Sheets, No. 16 to 21	6¼¢
Common Red Plates, 3-16 to 16	3.2¢
Blue Annealed, 3-16 to 16	3.4¢
Best Bloom Galvanized, discount	35 %
Second quality, discount	45 %

Steel Rails.—The market is somewhat unsettled, but there is ample demand for all that are offered for early delivery. It is impossible to quote individual transactions, as terms are in nearly all cases of a confidential nature, depending largely on time and place for delivery, &c. The extreme range, however, may be given as $56 for deferred, and $63 for early deliveries, with a considerable business at prices chiefly below $60, deliveries to commence about October. In foreign Rails several transactions are reported, chiefly at prices equal to $61 @ $62.50, according to date and destination of shipment.

Steel Blooms—Are entirely nominal, although buyers would pay about $43 @ $44 at tide, duty paid. They are offered in sterling, on apparently more favorable terms, but buyers are not willing to assume risks, and prefer to make offers in currency, duty paid.

Iron Rails.—There is a good deal of inquiry, but as most of the mills are full of work it is difficult to place orders to advantage. A 700-ton lot of 45s was placed at something over $47, and for ordinary sections $46.50 @ $47 appears to be low as manufacturers would be inclined to accept. English Rails are said to have been sold at $44.50 @ $45, but nothing has been done in this market upon which to base quotations. Prices may be quoted steady at $46.50 @ $51, at mill, according to pattern.

Railway Supplies.—Spikes are in good demand, and are quoted at $2.62½, although concessions could be obtained on large orders. Fish Plates are quoted 2.4¢ @ 2.5¢; Bolts and Nuts, 3.5¢ @ 4¢, according to specification.

Nails.—The demand is only moderate, considering the season, but with large consumption and light stocks; prices are steady at $3.15, less the usual trade discount.

Wrought Iron Pipe.—There is a fair business doing, but to secure large orders concessions have to be made. For retail lots there is a fair demand for Boiler Tubes at 45 %, and Steam and Gas Pipe 65 % discount from list price.

Coke.—There is an active demand, and contracts are being entered at $1.60 @ $1.65. Small lots a shade higher, say $1.70 free on cars at ovens.

Crop Ends.—A cargo was placed a few days ago at $27 ex ship, but it would be difficult to duplicate the sale, buyers having modified their views considerably.

Old Car Wheels.—The market is irregular, prices varying from $28 to $30, latest transactions reported having been at $29.25, Philadelphia.

Scrap Iron—Is very dull. Sales are hard to make, only selected lots being in demand. Choice No. 1 may be quoted at $29 @ $30; other descriptions, $27 @ $28. Cargo sale at $27.50 ex ship, Baltimore.

Old Rails.—The market is very dull, and so far as we can learn, there have been no transactions calling for special remark. Holders appear to be weakening, and $26.50 would probably be accepted by parties who were recently very firm at $27, but there is very little disposition to make offers. The market may be quoted dull and nominal at $26.50 @ $27 asked.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., May 24, 1881.

The indications are that the iron trade is about to assume a most satisfactory position in the raw article. Business has revived considerably during the past week, several large sales having been effected, and we are reliably informed that some large orders for the products have been placed. The nail trade, however, here in Pittsburgh, continues remarkably dull for this season of the year, while the demand for Window Glass has improved considerably, but prices are very unsatisfactory. For White Lead there has been an increased demand within the past few weeks, but there is no longer any combination price, hence there is more or less cutting, and the trade is less satisfactory in consequence. It is very evident that there is going to be an unusually active business in all kinds of building material, and manufacturers are hopeful of being able to obtain more satisfactory prices. Rail freights to all points both East and West have been reduced, which will better enable our manufacturers to meet competition.

Pig Iron.—There has been considerable of an improvement in demand during the past week, sales of some 6000 tons having been reported, and while prices are no better, and there is an absence of anything like a boom, a much better and more hopeful feeling prevails among furnacemen, some of whom, after such a protracted period of dullness, had become almost discouraged. The settlement of the labor question has had a good deal to do with the improvement referred to, as mill owners generally refused to anticipate future wants while the matter remained in abeyance, being apprehensive of a "hitch" with the Amalgamated Iron Association. No doubt business will be more active than it has been during the past two months or more, as the supply in mill yards is very much reduced, but the best-informed and most conservative operators do not look for any particular activity for some time to come. One of the most favorable features as regards the producing interest, is the fact that the offerings are not large, which is accounted for by many of the furnaces having been sold from one to three months ahead; hence, the stock in first hands for sale is not near as large as many suppose. Forge Irons quoted as before; native Ore, $20 @ $21, 4 mos. for White, and $21.50 @ $22.50 for Neutral; Lake Ore—$22 @ $23 for Neutral, $23.50 @ $24.50 for Red-short Cinder Mixture and $26 @ $27 for all Ore Red-Short; Bessemer quotable at $27.50 @ $28.50, 4 mos. Small sale for foundry use at $28.50. Foundry grades. $23.50 @ $25, 4 mos., for Nos. 2 and 1.

Manufactured Iron.—It is stated on good authority that some large orders have been placed here within the past week, and while, as a rule, business is still slow for the season, the demand is improving and prices are firmer, although without quotable change as yet. With the labor question disposed of, manufacturers are again ready for business, although, as a rule, they do not care to sell to any extent for future delivery. In view of the limited spring trade, with reports from all quarters favorable for the crops, an unusually large summer trade is looked for. We continue to quote Bars at 2.15¢ @ 2.25¢ rates, 60 days, 2 % off for cash; Sheet, 3.50¢ @ $3.60 for No. 24; Tank, 2.65¢ @ 2.75¢; Hoop, 2.80¢ @ 2.90¢. The building of new oil tanks, projected by the Standard Oil Company, will, it is said, require about 20,000 tons of Tank Iron, and, as a consequence, there has been a stiffening in price within the past few weeks.

Nails.—Notwithstanding the month of May is well advanced when the spring trade is usually about over, here in Pittsburgh it has not fairly opened yet, and reports of a similar character come to us from Wheeling. While the card remains unchanged, it is not being adhered to: there is no trouble in buying at from 10¢ @ 15¢ per keg under the card price, or say $2.85 @ $2.90, net cash.

Wrought Iron Pipe.—While business is still backward as compared with what it was at this time last year, it is steadily increasing, and the prospect is that makers will have about all they can do from now until the close of the year. Discounts on Gas and Steam Pipe unchanged at 67½ @ 70 %; on Boiler Tubes, 45 %; Oil-well Casing and Tubing unchanged at 70¢ per foot, net, for the former, and 21¢ for the latter.

Railway Supplies.—There have been no recent sales of Steel Rails reported. Railway Spikes unchanged at 2¾¢, 30 days; Splice Bars, 2.25¢ @ 2.35¢; Track Bolts, 3.25¢ @ 3.50¢. Manufacturers generally are well supplied with orders, and the outlook is favorable for an active business until cold weather sets in, as a great many new roads are being constructed, and as the old ones are all very busy they are increasing their rolling stock.

Steel.—There is nothing new to report. Manufacturers report business as being backward, and but few, if any, of them are working up to their full capacity. No recent change in prices. Best brands of Refined Cast Steel, 11¢; ditto Crucible Machinery, 7¢; Bessemer and Open-hearth Machinery, 5¢ @ 5¼¢; ditto Spring, 4¢ @ 4¼¢; ditto Plow, 4¢ @ 4½¢.

Scrap.—While business is less active as compared with what it was a month ago, there is a fair degree of activity, and as a rule prices are steady. No. 1 Wrought, $29 @ $31 per net ton; Old Car Axles, $35 @ $37; Old Car Springs, $38 @ $40; No. 1 Turnings, $22 @ $23; Boiler Iron, $29 @ $30; Steel Crop Ends, $29 @ $30, gross; Old Car Wheels, $30 @ $32, gross; No. 1 Machinery Metal, $22 @ $23,; Cast Borings, $16 @ $17, gross.

Window Glass.—Some manufacturers report business as being better, both as regards demand and price, while others make a different statement. Prices have been very unsatisfactory all the year, and nearly all the leading makers here have refused and are still refusing, to book orders at the price generally quoted, although, as yet, it is difficult to obtain an advance. A leading manufacturer remarked the other day that he was receiving a good many inquiries, but after sending prices, never heard from them again; he was satisfied that buyers were able to do better elsewhere. Stocks in first hands are large, but there will be a general blowing out the last of this month, production will be shut off three months this summer instead of two, and makers have an abiding hope of being able to obtain better prices before long. The asking rates at present are 70 % discount on Single and 75 % on Double, but, as yet, it is difficult to effect sales at these rates.

Coke.—There is a steady demand, and while the production is large and steadily increasing, the consumption continues to keep pace with it, and prices are steady. Shipments are being made in all directions, and as there is less difficulty in getting cars, the movement is larger, probably, than ever. We repeat former quotations, $1.65 @ $1.75 per ton, free on cars at ovens.

CHICAGO.

Office of *The Iron Age*, 36 and 38 Clark Street, cor. Lake Street, CHICAGO, May 23, 1881.

Pig Iron.—The demand for Lake Superior Charcoal Iron has been fair, with a good many inquiries during the past week; quotations remain firm, while the market for other Irons has been somewhat weak, owing no doubt to the fact that dealers have at present sufficient stock on hand to supply the immediate wants of their customers, and are still looking forward to a decline in prices, which in some instances will probably be the case, as furnacemen are inclined to make some concession just now to secure business. This statement would not apply to Lake Irons, the market for which, as previously stated, is in a good healthy condition. We quote: Lake Superior Charcoal Nos. 1 and 2, $32; No. 3, $33; Nos. 4, 5 and 6, $34; Scotch Imported (according to brand), $27.50 @ $29; Scotch American (according to brand), $27 @ $29; Anthracite, $25 @ $27; Coke, $25 @ $27; Silvery (soft), $24 @ $26.

Rails.—Iron Rails continue to be in fair demand. We quote, according to specification, $50 @ $51.

Manufactured Iron.—The condition of the market for Manufactured Iron has been fair and the demand good, with occasional cutting in prices. We have no change to note in quotations, which are as follows:

Bar, $2.30 @ $2.40; Sheet Iron, from 10 to 14 gauge, at $3.40, and $3.30 for large lots; Tank Iron, $3.40, and $3.30 for large quantities; Hoop Iron, $3.20 @ $3.30.

Nails.—The demand for Nails continues fair, with light stocks on hand. We quote: $3.10 for ordinary orders, and $3 for carload lots, less 2 % for cash.

Steel.—We have no change to note in quotations, the demand for which is fair at prices given. Tool, 11½¢; Machinery (open hearth), 6¢; Crucible Machinery, 7¢; Hammer (Cast), 2 inches and under, 8¢; over 2 inches, 10¢; Cast Spring, 6½¢; Open-hearth Spring, Tire and Sleigh Shoe, 5¢. In large lots these prices would be shaded.

Scrap Iron.—Scrap Iron is again weak, with little or no demand. We quote nominally: No. 1 Wrought, $26 @ $27; Forge Scrap, $32; Heavy Cast, $22; Stove Plate, $15.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., CHATTANOOGA, May 23, 1881.

The tendency of manufactured articles of the heavier kinds is slowly and gradually downward. The reduction is so slow and so many producers hold out for full figures, that it will perhaps require a month to establish reliable lower quotations. The general impression among close and intelligent observers favors a good and remunerative fall trade. Agricultural prospects are excellent, and it is hardly likely that another season as bad for securing crops as the last one was will soon appear. Merchants are extending planters' accounts cheerfully to the extent of their abilities, and manufacturers show no disposition to slack off production. The weather for the week has been cool and dry.

Pig Iron.—The market goes on in a humdrum way, easy and in favor of buyers generally. Prices of the best grades are well maintained. We quote: No. 1 Foundry, $22 @ $24; No. 2 Foundry, $20 @ $21; Gray Forge, $18 @ $19; White and Mottled, $16 @ $18; Car-wheel Metal, $38 @ 40.

Ores.—We quote: 50 % Brown Hematite, per ton, $2 @ $2.75; Red Fossil, $2 @ $2.25.

Miscellaneous Articles.—This list is sharply affected by the comparatively weak and lowering prices of Pig Iron. We quote: Old Rails, nominal at $26 @ $28; Wrought Scrap, $20 @ $25; Cast Scrap, $10 @ $15; Old Wheels, $28 @ $30.

Nails—Continue dull. We quote them nominal at $3.10 for small lots. Manufacturers are running full, and seem to be in possession of facts warranting them in counting on a good summer trade.

Manufactured Iron.—Bar Iron manufacturers report that they have a fair business, with but small profit in it. Track supplies are in good demand, and prices are well maintained. We quote Bars at $2.25 rates; Spikes, $3.15; Track Bolts, $4; Trestle Bolts, $4.50; Fish Plate, $2.50.

Coal.—Nearly all the heavy producers have lightened up for the summer season. One cause, and probably the principal one, for the high prices paid here by householders in the winter is the inability or unwillingness of miners or dealers to accumulate stocks in the hot season against the demand in the cold season. Contracts could be made now for carload lots, delivered in bins, at 12¢ per bushel at mills; run of mine, $2 per net ton.

Coke.—We quote: Furnace Coke, $3 per ton at furnace; Foundry, 10¢ @ 12¢ per bushel.

Steel and Iron Rails.—Steel Bars, $62 at mill; Iron, $50 @ $52; Small, $57 @ $60.

BOSTON.

MAY 21.—The demand for raw Iron continues light and values tending in buyers' favor. Furnacemen are taking contracts at a lower figure than five or six weeks ago. But though there has been no actual change in the market, we must report a little more sanguine feeling than at the time of our last issue. We quote *American Pig Iron* at $24 for No. 1 X; $21 @ $22 for No. 2 X, and $19 @ $20 for Gray Forge. These prices are f. o. b. at the port of shipment. Small spot lots will command $2 ℔ ton higher. *Foreign Pig* is in light demand at about the same prices last noted. We quote Coltness and Langloan at $23.50; Glengarnock and Gartsherrie at $22.50; Carnbroe at $21.50; Eglinton at $20.50 @ $21; and Middlesbro' ("Clarence") at $17.50 for No. 3, and $19 @ $19.50 for No. 1. *Old Rails* are quiet at $29 @ $30 for American and $26 @ $28 for Foreign. *Manufactured Iron* is in moderate demand at the same prices as last noted. Refined Bars are selling at $2.25. Swedish or Norway is unchanged at $3.75 for Bars and $4.75 for Shapes. Plate Iron is steady at $2.75 for Common and Tank; $3 for C. No. 1; $3.40 for C. H. No. 1 Shell, and $4.40 for C. H. No. 1 Flange. *Nails* are quiet at $3.05 @ $3.15, net. Boiler Tubes are selling at 50 % off, though the advertised discount is 45 %. The Boston store prices of *Steel* are as follows: Best English Cast, 14¢ @ 14½¢; American ditto, 12¢ @ 12½¢; Bessemer Machinery, 5¢ @ 6¢; Crucible ditto, 7¢ @ 7½¢; Wedge and German, 7¢; English Spring and Calking, 7¢ @ 7½¢; American Spring and Calking, 5¢ @ 5½¢; Tire, 3½¢ @ 3¾¢; Sleigh Shoe, 3¢ @ 3¼¢. *Copper* is dull and weak, and Lake is obtainable at 18½¢ and Baltimore at 18⅜¢ @ 18½¢. Smaller lots from store command ¼¢ above those figures. There has been no change in the combination prices of Manufactured Copper. We quote: New Sheathing Copper at 26¢; Braziers, 28¢; and Bolts, 28¢; Bottoms, 31¢; American Yellow Sheathing Metal, 17¢ @ 18¢; Yellow Metal Bolts, 20¢, and English Yellow Metal Sheathing, 14¢, in bond. *Lead* is quiet and steady at 4⅝¢ for good-sized lots, and 4⅞¢ @ 5¢ for smaller quantities. The prices of manufactured are unchanged, as follows: Bar, 6½¢; Pipe, 6½¢; Sheet, 7¢; Tin-lined Pipe, 15¢; Tin Pipe, 40¢, all less 10 % to the trade. No. 1 Solder, 11½¢. *Spelter* is unchanged, and we quote $5.05 by the carload for Western, and 4⅞¢ for remelted. Small lots bring ¼¢ above those figures. Sheet Zinc is in good demand at 7¢ @ 7¼¢. *Tin* is quiet and barely steady at 20¼¢ @ 20½¢ for Straits and English. *Tin Plates* are quiet and prices are not quite as firm as they were. We quote: Charcoal Bright, $6 @ $6.25; ditto Ternes, $5.50 @ $5.75; Coke Tin, $5 @ $5.25; ditto Ternes, $4.87½ @ $5. —*Commercial Bulletin.*

LOUISVILLE.

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 113 and 115 Main street, report to us as follows, under date of May 21: Trade is fairly active for the season; that is to say, there is a large amount of goods moving, but not the slightest excitement in any quarter. The market seems to be in that perverse state that whatever a buyer wants badly is hard to get promptly and commands a full price, while such goods as are in stock hardly bring more than cost price. Nails show no improvement, and it may be said that the last two advances by the manufacturers have amounted to nothing at all. Wheelbarrows, road scrapers and tools of all kinds are in best demand. Outdoor construction is progressing finely in this bright, dry weather.

Messrs. GEO. H. HULL & Co., Commission Merchants, report to us as follows, under date of May 20: The market continues quiet, with few sales and very little, if any, change in prices, though indications are that if any considerable lots were pressed on the market it would cause a decline.

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$27.00 @ 28.00
No. 2 " "	25.00 @ 27.00
No. 1 Southern, Charcoal	23.00 @ 24.00
No. 2 " "	22.50 @ 23.00
No. 1 Hanging Rock, Stonecoal and Coke	23.50 @ 24.00
No. 2 Hanging Rock, Stonecoal and Coke	22.50 @ 23.00
No. 1 Southern, Stonecoal and Coke	23.00 @ 24.00
No. 2 " " "	22.00 @ 22.50
"American Scotch"	22.50 @ 23.50
Silver Gray	20.50 @ 22.50
Scotch	24.00 @ 25.00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neutral	22.00 @ 23.00
No. 1 Stonecoal and Coke, Cold-short and Neutral	21.00 @ 21.50
No. 2 Stonecoal and Coke, Cold-short and Neutral	20.00 @ 20.50
No. 1 Missouri and Indiana Red-short	26.00 @ 27.00
White and Mottled, Cold-short and Neutral	17.00 @ 19.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	35.00 @ 41.00
Alabama and Georgia, Cold-blast	35.00 @ 40.00
Kentucky, Cold-blast	35.00 @ 40.00

ST. LOUIS.

Messrs. HOFFER, PLUMB & Co., Pig Iron and Iron Ore Merchants, 417 Pine street, write as follows, under date of May 21: The market here is still very dull. Nominally prices are as follows:

HOT BLAST CHARCOAL.

Missouri, No. 1	$27.00 @ 27.50
Southern, No. 1	25.00 @ 25.50
Hanging Rock	28.00 @ 29.00

COKE AND COAL.

Missouri No. 1	26 50 @ 27.00
Southern No. 1	24.50 @ 25.00
Ohio No. 1	24.00 @ 25.00

MILL IRONS.

Cold-short	21.50 @ 22.50
Red-short	25.00 @ 26.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri	31.00 @ 32.00
Southern	35.00 @ 38.00
Ohio	35.00 @ 42.00

BALTIMORE.

R. C. HOFFMAN & Co., Iron and Commission Merchants, report the Pig Iron market as follows, under date of May 23: The Iron market remains quiet, with a large consumption of Iron going on, and purchases generally confined to immediate wants. Prices without material change. We quote as follows, f. o. b. here:

Baltimore Charcoal Wheel Iron	$37.00 @ $39.00
Virginia C. B. Wheel Iron	37.00 @ 39.00
Anthracite No. 1	24.00 @ 26.00
" No. 2	23.00 @ 24.00
" No. 3	20.00 @ 22.00
" Mottled and White	19.00 @ 20.00
Charcoal C. B. Blooms	60.00 @ 65.00
Refined Blooms	50.00 @ 55.00

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of May 23: Trade continues ruling improved, though the demand is confined to immediate and actual wants, with close margins in same. We quote:

Ref. Bar Iron, 1 to 6 x ⅜ to 1	℔ 2 2½ @ 2⅜¢
" " 1 to 4½ x 1½ to 3	℔ 2 2½ @ 2¾¢
" ¾ to 2, Round and Square	℔ 2½ @ 2¾¢
Hoop Iron, 1½ wide and upward	" 3½ @ 3½¢
Band Iron, from 1¼ to 4 in. wide	" 3 @ 3¼¢
Horse-shoe Iron	" 3¾ @ 4 ¢
Norway Nail Rods	" 6¼ @ 6½¢
Black Diamond Cast Steel	" 13½ @ 14½¢
Machinery Steel	" 9 @ 9½¢
Cast Spring Steel	" 8 @ 8½¢
Common Horse Nails	" 10 @ 14 ¢
Perkins' Horse shoes, ℔ keg of 100 lbs	$4.37½
" Mule shoes	5.37½

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of May 23: Prices are stiffening, with less disposition on the part of large consumers to demand concessions. One of our founders has closed a contract for 500 tons of castings. We quote, without change:

Scotch Pig Iron	$23.00 @ 27.00
No. 1 Anthracite ditto	22.00 @ 26.00
No. 2 "	20.00 @ 23.50
No. 3 "	19 00 @ 22.50
Mottled and White ditto	18.00 @ 21.00
No. 1 Virginia Coke Pig Iron	23.00 @ 24.50
No. 2 " "	22.00 @ 23.50
Virginia Charcoal C. B. Wheel Iron	36.00 @ 38.00
Old Rails	26.00 @ 27.00
Wrought Scrap, No. 1	23.00 @ 25 00
Cast, Machinery Scrap, No. 1	20.00 @ 22.00
Richmond Refined Bar Iron	@ 2.5
Horse Shoes, Tredegar	@ 4.00
Mule " "	@ 5.00
Freight to New York, by sail, $1.80 for 2240 lbs.	

CINCINNATI.

MAY 23.—*Pig Iron.*—The output to consumers during the past week was largely in excess of the week previous, and at prices about the same as formerly quoted. Some of the lower grades from bituminous coals are in excess of demand, and are freely offered in round lots at a concession in prices. Best No. 1 Charcoal Foundry, $27.50; Good No. 1, $26.50 @ $27; No. 2, $25 @ $25.50; Warm blast Charcoal Car-wheel and Machinery, $26 @ $30 for Hanging Rock and $35 @ $36 for Southern. Cold-blast Charcoal Car Wheel, $35 @ $38; No. 1 Coke, $24.50 @ $25; good No. 2, $22 @ $23.50; best Stonecoal, $23 @ $24; Silver-gray Softeners, No. 1, $22; good, $21.50; No. 2, $20.50; No. 3, $19.50 @ $20, all f. o. b. here, 4 months. Wrought Scrap, $1.10 @ $1.50; Cast, 60¢ @ 80¢; Old Rails, $28.50 @ $30; Old Car Wheels, $31.50 @ $32.50; Bar Iron, $2.15 @ $2.25, card rate.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(*From our Regular Correspondent.*)

LONDON, ENG., May 9, 1881.

THE INSTITUTE MEETING

held in London during the Wednesday, Thursday and Friday of last week has naturally attracted a great deal of attention, besides having been the means of bringing to the metropolis a large number of the principal iron and steel manufacturers of this country and the Continent. The proceedings were interesting, as they always are, but were free from the exciting expectations which have on some occasions been characteristic of these gatherings. Nothing new as to dephosphorization being anticipated or promised, and no other novelty being on the cards, those present had no idea of a surprise, and attended simply to gain or communicate experience and to compare notes on points touching upon ordinary practice. In 1879 the feeling was very different. The discovery of Mr. Thomas had then been announced, but had not been explicity explained. Consequently the Institute spring meeting was thronged with iron and steel men from all parts of the world, anxious to learn all about the then latest metallurgical discovery. What transpired is now a matter of history, as is also the case with the report of Mr. Windsor Richards at the subsequent meeting of the members. Only one paper on the question appeared on the agenda paper this time, and its reading was postponed until the autumn meeting, which, by-the by, will take place in London during the first week of October. The author of this paper was M. Rollet, of St. Chamond Works, France. I have read his report and do not recognize anything particularly new or striking therein. Of the other papers I need say nothing here, as by this time you will doubtless have received the copies of them forwarded by me on the first day of the meeting. The address of the new president, Mr. J. T. Smith, of Barrow, was an exceedingly able review of the metallurgical situation, as well as of the recent past, present and near future of the iron, steel and allied industries. There was little of a strictly technological nature in Mr. Smith's address, but its general contents were marked by so much ability that I venture to predict for it a leading place in the archives of the Institute. Judging from the full report given by the *Ironmonger* (the only complete and respectable report of the meeting I have as yet seen) the discussions were of fully average merit. On two or three heads the speeches were timely and valuable, notably those relating to steel for shipbuilding, Bessemer steel working and making, and the vexed question of the behavior of cast iron during heating and cooling. As has been the case of late years, the tone of the proceedings was essentially steel-y, notwithstanding, I may say, some iron-y in the remarks of Sir Henry Bessemer and others. Iron seems to be very much in the background at these gatherings, and if attention and investigation are likely to secure perfection in steel making and working, one would suppose that that result might safely be considered assured. It is pretty plain, from the criticisms of Mr. Parker, Mr. White and other eminent naval authorities, that perfection has not as yet been attained, but that the accumulated experience of the shipbuilders and of the steel plate rollers is so forcible and so systematically applied, that the newer material is on the eve of being as safely and unvaryingly manipulated as the best of iron. The relative merits of Bessemer and Siemens plates came under review, and there seemed to be a competent expression of opinion that the quality of one was quite equal to that of the other. Several well-known gentlemen, indeed, were quite emphatic in this view. The paper of Capt. Jones, of the Edgar Thomson Works, was read to a very attentive audience, including your obedient servant. It was clearly a surprise to many of those present, but the statistics of production were quite as heartily received as though they related to a British establishment—a circumstance which must be received as new and striking evidence of the truly cosmopolitan character of the Institute. Both Mr. Richards and Mr. Smith conceded your supremacy in blowing (the steel), but the former thought we were yet ahead in the rolling. Mr. Richards said the ingot make "had taken a little of the conceit out of him," but he thought you couldn't roll 300 tons a shift. Mr. Walker (of Tannett & Walker, the well-known engineers, of Leeds) said that at the Dronfield Works of Wilson & Cammell he had been told they made more than 50 blows in the 24 hours, of 8 tons each, and rolled nearly 400 tons of steel. This would be equal to a make of 2400 tons of ingots weekly and nearly the same quantity of rails, produced, I believe, from 4 converters and by 25 men. The paper of Mr. Markham, of Staveley, a leading iron founder and a clever engineer, provoked a strong discussion. He argued that the contraction, and not the expansion, of iron in foundry work is a constant source of anxiety. Mr. Wrightson, who had advocated opposite views at the last meeting, vigorously criticised Mr. Markham's data and inferences, as also did Mr. Lowthian Bell and Sir John Alleyne, of Butterley. It elicited some useful remarks, and was, on the whole, a curious example of "doctors differing." As to the other papers, &c., I need say nothing here, having no doubt that you will do justice to anything meriting your reproduction or comments. A number of new members were elected, I may add, bringing the total to beyond 1100.

TRADE MATTERS

are just as quiet and uninteresting as at the date of my last week's letter. There has been no movement in iron of any value, nor are there any signs of such a change. In all directions the enormous overplus of iron is paralyzing business, no buyer in his senses being likely to order an ounce more than he needs, so long as hundreds of thousands of tons are piled up all over the country. It is actually stated that several additional furnaces are being prepared for restarting in Scotland, but I hesitate to credit such a statement, even in the face of the evidence we have of what is being and has been done in the way of overproduction. The report may be true, and if so, the facts it foreshadows will add to the depression already existing. The reserve stocks in Scotland have been augmented since my last letter, and the official returns of the Cleveland ironmasters show an augmentation during April of over 5000 tons. All this is piling on the agony, and adds new straws to the failing back of the patient British camel. Whether these points were or were not discussed at the annual meeting of the British Iron Trade Association on Thursday last, I am unable to state, the meeting being conducted *in camera*. The report (which I have not seen published *in extenso* in this country) would seem to show that such was not the case, as the point is not alluded to. Manufactured iron is in fair request as regards heavy sorts for constructive purposes, but ordinary merchant iron bars, sheets, hoops, plates, strips and car are exceedingly dull and slow of sale. Marked bars remain unchanged at £7 @ £7. 10/, but excellent bars are selling at £6 @ £6. 10/, and others at all sorts of figures down to £5. 2/6 for Welsh. Until the home trade revives these branches are certain to remain in a more or less lethargic and unprofitable condition.

SCOTCH PIG IRON

is without life, and is a trifle easier on the week, both as regards warrants and makers' brands. There are still 122 furnaces blowing in Scotland, as against 114 this date 1880. In Connal's stores the quantity is 552,746 tons, against 439,181 a year ago, while shipments to date this year have decreased by 103,767 tons, on a total of 170,331 tons. Importations of Cleveland pigs into Scotland have increased 21,432 tons, on a total of 97,102 tons to date this year. Writing from Glasgow, May 7, James Watson & Co. said: "We have again to report a weaker market for Scotch pig iron, prices being lower on account of disappointment in the demand and the continued increase to stocks. On Monday there was no market, owing to it being a bank holiday. On Tuesday the market was lifeless, with a moderate business between 47/7, 47/6 and 47/7½, cash. On Wednesday it was steady, with transactions from 47/6½ to 47/7½ per ton. Yesterday the price declined from 47/7 to 47/5 per ton, and to-day it has further receded from 47/4½ to 47/2, cash, closing with sellers at the latter figure, buyers very near. The demand for shipping iron is remarkably quiet. In last week's circular we reported shipments as being 14,492, while the correct figures were 11,492 tons. This week's shipments were returned as 13,147 tons, as against 17,749 tons for the corresponding week of last year." We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	48/3	46/3
Gartsherrie, "	57/3	49/3
Coltness, "	57/3	49/3
Summerlee, "	56/	48/9
Langloan, "	57/6	49/
Carnbroe, "	53/6	48 6
Calder, "	57/	49/
Glengarnock, at Ardrossan	54/	49/
Eglinton, "	48/3	46/3
Dalmellington, "	48/3	46/3
Shotts, at Leith	57/6	50/6
Kinneil, at Bo'ness	48/	46/
Carron, at Grangemouth	49/	48/

CLEVELAND PIG IRON

is quiet and moderately steady at following rates for G. M. B., net cash, at maker's wharves in Tees:

No. 1 Foundry	42/	Mottled	36/6
2 "	40/	White	36/
3 "	38/	Refined Metal	54/6
4 "	37/6	Kentledge	41/
4 Forge	37/		

The official returns of the Cleveland Ironmasters' Association for the month of April show the subjoined particulars, summarized for the sake of space—the quantities are for 8:

	April.	March.
Number of furnaces blowing	119	120
Total make of Cleveland pig	176,964	179,864
Make of hematites, &c	55,975	55,020
Furnaces on Cleveland pig	94	94
Do. on other pigs	25	26
Total makers' stocks April 30	143,499	150,842
Makers' stores	75,845	73-375
Pig iron in public stores	189,637	182,140
Total stock	411,981	466,357
Increase in stock	5,624	.....
Shipments, foreign	39,405	36,901
Do. coastwise	39,489	44,708
Net decrease in shipments	2,715	.....

It is stated that two additional steel works are about to be started in the Cleveland district.

THE HEMATITES

of the west coast—West Cumberland and the Furness district of North Lancashire—are quiet and somewhat slow of sale. In the locality there are 81 furnaces built, of which 57 are in blast. The estimated rate of production is at the rate of 26,650 tons per week. From Barrow, Maryport, &c., there were last week shipped 21,842 tons of pig iron, 3335 tons of steel rails. This does not include consignments by rail or the pig iron used within the district. At Barrow alone the consumption of ores and make of pig are enormous, that great establishment being still fairly active in all departments. Present quotations for hematites are as under, subject to some little reduction for large parcels:

	No. 1.	No. 2.	No. 3.
Cleator	65/	63/6	62/
Lonsdale	58/	57/	56/
Workington	58/	57/	56/
West Cumberland	58/	57/	56/
Lowther	58/	57/	56/
Moss Bay	58/	57/	56/
Harrington	58/	57/	56/
Solway	58/	57/	56/
Maryport	59/	57/6	56/

SOUTH WALES, MONMOUTHSHIRE, ETC.

Considerable commotion has been caused by the announcement that iron making will in future cease to be the chief feature of the Cyfarthfa Works, Messrs. Crawshay Bros. having resolved to erect Bessemer and Siemens steel plant. I do not know in how far the latter part of this announcement may be correct, but I hear, on excellent authority, that Messrs. Crawshay have declined to book further orders for iron rails, of which they make about 800 tons weekly. There is no reason whatever why Cyfarthfa should not produce steel, and once the wealth of the proprietors is turned into that channel they would clearly take quite a share of the business. Hitherto, however, they have been very conservative on these matters, and have always adhered to the old-fashioned way of doing things. From the ports of the Bristol Channel—Cardiff, Bristol, Newport and Swansea—there were shipped during April: To New York 400 tons scrap iron, 4665 tons rails, 1098 tons crop ends, 751 tons and 4079 blooms, 4410 bundles of wire, 69,265 boxes tin plates, 1256 tons spiegel, 1000 tons pig iron, 28 tons leaf spring steel, 25 barrels tin, 449 bundles sheet iron, 120 cases yellow metal. To Baltimore 544 tons crop ends, 1654 blooms, 6633 boxes of tin plates and 150 tons pig iron. To New Orleans 134479 tons of rails, and to Galveston 1600 tons rails. The monthly freight circular of M. W. Y. Edwards, Cardiff, has the following remarks: "The Southern ports still continue to draw by far the largest quantity of rails, particularly New Orleans. The quantity shipped to that port during the past month exceeds by far what has been sent there for some months past. Notwithstanding this, the freight market to that particular port has shown no sign of an increase, in consequence of nearly the entire quantity having been contracted for some months past; 14/ may be looked on as the rate ruling, and likely to be for the next two or three months, and I am of the opinion that no scarcity of tonnage will be experienced at this figure. Galveston wharf has fully come up to my prediction of rate. Notwithstanding the very small amount shipped, the freight has been fully maintained at 24/ to the wharf and 18/6 to the bay. No reduction can be looked for on these figures until the cotton season sets in. The Atlantic ports have shown a much stronger demand for tonnage, New York having taken several outside boats, as well as Baltimore and Philadelphia. The rate of freight ruling to the former may be looked on at 10/6 to 11/; Baltimore and Philadelphia, 12/ to 12/6, with a firm and upward tendency. This may be accounted for to a great extent by the fact that the homeward markets show no sign of improvement."

THE TIN PLATE TRADE

is without special feature to note. Prices are quiet on the basis of about 16/ per box for ordinary cokes in Liverpool, although it is reported that 6d. or 9d. less money is in some instances being paid. Differences of opinion exist as to the actual quantities now stored at the leading outports, and capital is being attempted to be made in both directions by interested parties. The *Ironmonger* publishes the views of both sides, which I reproduce for the benefit of consumers and dealers on your side. Messrs. D. Edwards & Co., of Swansea, having sent out circulars in order to ascertain the exact stocks, report that the reserve stock at Swansea, Cardiff and Bristol does not much exceed 41,000 boxes, the total being made up as follows:

	Boxes.
Swansea—M. Jones & Bros	none
Bristol Channel S. P. Co	none
Burgess & Co	none
G. W. Railway Co	1,700
Cardiff—W. Y. Edwards	7,000
Bristol—Mark Whitwell & Sons	30,000
Henry R. James	3,000
Total	41,700

At Liverpool, Messrs. Edwards & Co. estimate the stock at 290,000 boxes, making an estimated aggregate of 331,700 boxes.

Another firm, said to be "influential and well informed," write: "The figures relative to stocks given at the quarterly meeting of the associated masters on Thursday last were:

	Boxes.
Estimated stock at Liverpool	320,000
Estimated stock at Bristol	100,000
Estimated stock at Cardiff, &c	100,000
Total stocks	520,000

Previous to the strike the Liverpool stocks, you will recollect, were variously estimated as being between 400,000 and 500,000 boxes, while the Bristol and Cardiff stocks were not supposed to exceed 120,000 boxes. Arguing from these figures, it is not supposed that the reduction in stock Feb. 1 is more than 100,000 to 120,000 boxes. We do not recollect that any estimate was given at the meeting as to the make, but we give you our figures on the point, carefully worked out within the last few days. In the United Kingdom there are 96 works, with 372 mills, equal to an annual output of 8,213,000 boxes. The number of mills idle in the association works, where the iron-workers' strike exists, can only be estimated from the returns made to the association for the quarter ended March 26, as almost every maker has a few mills going just as supplies of 'tin bars' may be forthcoming. The returns to the association for quarter ended March 26, as compared with the previous quarter, when all were in full work, show a reduction of 120,000 boxes, equal to 60,000 per month from Feb. 1, the date of the strike. This represents the output of 30 (Glamorganshire) mills at 500 boxes per week per mill. Then the number of mills at a stand from other causes are 39, equal to an output of 17,550 boxes per week, or 877,500 boxes per annum.

"Now, if from 8,213,000 boxes are deducted these figures for idle mills, viz.: 30 mills on stop owing to strike, 720,000, and 39 mills from other causes, 877,500, equal to 1,597,500, it leaves 6,615,500 boxes as the present annual rate of production. Most of the estimates given of the home consumption are far too low. The estimate was 1,000,000 several years ago, and we do not think it was at that time far from being correct; but at the present time, and even in 1880, the home consumption was not far short of 2,000,000 boxes. The total exports in 1880 were, we think, 217,699 tons, roughly say 2,353,980 boxes, to which add home consumption, 2,000,000 boxes, and say exported as black plates, 250,000 boxes, making a total

of 6,693,980 boxes, which, we think, is a nearer estimate of the production of 1880 than what we have seen in several papers recently."

The strike of the forgemen continues, and is, apparently, quite unlikely to come to a speedy termination, both sides being firm and unyielding. At two or three establishments, however, work is being irregularly carried on with tin bars purchased in the open market. All things considered, it is probable that the current make is larger than is generally thought, and that the rise in prices so confidently expected will take effect quite gradually.

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, May 3, 1881.—*Metals.*—Business, favored by finer weather, has been brisker during the week in nearly every branch of trade, including Metals; without change in the latter, we, therefore, merely refer to our last quotations, which remain unaltered. *Iron.*—The market continues very active, but there is no further improvement in prices. We quote: First-class Merchant Iron, 19.50 francs the 100 kilos.; Flooring ditto, 22 for common sorts, and the better classes, 23 @ 25. In the Haute-Marne work is still steady, but activity is more limited to the filling of old orders than to new commands. They quote: Coke Merchant Iron, 19; Mixed, 20 50 @ 21; Machine Mixed, 20 @ 20.50. Foundries have more work on hand than they can conveniently attend to; this relates more particularly to castings for architectural purposes. Iron Wire is less in request in the district; No. 20 is bringing 23 @ 24 francs. Nails are also less wanted; No. 18 is worth 27.50 @ 28 in bulk. At the North a brisk trade is transacting; prices are well sustained at 17.50 @ 18 for first-class Merchant Iron. The Louvroil Rolling Mill has been reconstructed under the style of the Northern Iron and Steel Company, with a capital of 2,500,000 francs, 1,400,000 francs of which is predecessors contribute, 300,000 Mr. Wauthy personally and 800,000 various shareholders. Mr. Wauthy transfers to the new concern his dephosphorizing license; the contract is made for 50 years. *Coal* has been moderately active at tolerably well-sustained prices; the demand for industrial purposes is, on the whole, satisfactory, inasmuch as many branches besides the Iron line have come in as purchasers since the beginning of the month.

BELGIUM.

(Revue Universelle.)

BRUSSELS, May 8, 1881.—*Iron.*—The Iron situation has gone on improving somewhat in the course of the week, some further export orders having dropped in, particularly for the extreme East. Rolling mills, Structural Iron works, Boiler makers and steel works are the concerns most favored just at present. Competition among makers is, on the whole, very great, however, causing prices to rule low. Fortunately our next door neighbors, the French, seem to be getting on better for the past few weeks, and if the improved feeling and activity there are kept up, we can hardly fail to feel the favorable effect of it. The government will also not unlikely come out with some adjudications, if but to a moderate extent; between its requirements, the usual local demand, some business accruing to us from France, and perhaps from Germany, and the export to more distant countries, we still hope to have as active a time during the summer months as usually falls to our lot, the more so as the moderate prices ruling here hold out an inducement to the consumers to seek our market. Had speculation interfered and driven up prices in the spring, an unsound state of affairs might have been created, and the prospect before us would be less reassuring. *Metals.*—Copper is weak; Spelter is without change; Lead, though quiet, is rather firmer; Tin better held. *Coal.*—Prices have been upheld, tonks not being excessive and production being curtailed for the time being. While for household wants little Coal is sold, the demand for industrial purposes continues general and active At Liege prices are firm.

GERMANY.

(Borsenhalle.)

HAMBURG, May 10, 1881.—*Iron.*—Our Dortmund correspondent communicates the following, dated yesterday: "For some weeks past prices have been stationary, but last week a further downward reaction took place. Bessemer Pig has been affected by the gradual decline of Bessemer Hematites in England from 65/ to 56/. Spiegeleisen for the moment still remains in good request, while the tendency in Puddle and Foundry Pig is an exceedingly weak one; it is consequently to be feared that ere long, unless a favorable change occurs, a number of blast furnaces will be blown out, for at ruling rates for Pig there is no profit left. At the rolling mills there is also increased dullness; only Boiler Sheets are still much wanted, while thin Sheet Iron has ceased to be in good demand. Nor is it likely that the rolling mills will are better from now forward, for if they complain of the lack of work now that we have still got the benefit of the spring building demand, their position will get to be worse by the time this demand half also have disappeared. And this untoward tate of affairs is rendered worse still by the fact hat competition is on the increase, for within a circumference of five hours' distance two rolling mills have recommenced operations, and two more will shortly be added. Hardly any orders were received by our rolling mills from Russia so far, whereas in former years when navigation opened in that country we have been in the habit of doing a brisk business in the line in that direction. This disappointment arises from the higher Iron duties n Russia, the extreme depression of Merchant Iron at the upper Silesian rolling mills, and the disturbed condition of local politics in Russia. Bessemer Steel Rails are as active as before; Rolled Wire has also been sustained, but the machine shops, the foundries and bridge building establishments are all very much in need of fresh orders. The gun and rifle manufactories have received but few orders, with the exception of Krupp, where there is a feverish activity. His orders for field, &c., artillery are very large, so much so that numbers of fresh hands have had to be procured; but, alas, this activity is of short duration. I quote: Merchant Iron, 113 @ 116 marks; Boiler Sheets, 18c; Dortmund Foundry Pig, No. 1, 70; No. 2, 63, and No. 3, 57 per ton at the works. *Coal* is moderately active; the demand for brick works s on the increase, and the entire position better than last year at this time, with lower prices than they were then. Coke is dull." In the Moselle and Sarre region Pig Iron has been lowered from 9 francs to 47. There is a hopeful feeling, in view of the advantages which the district enjoys with respect to the Thomas-Gilchrist process. *Metals.*—Small sales to meet the requirements of consumers have taken place, Lead being rather cheaper. We quote: English Pig, 16.30 @ 16.50; ditto Sheet, 16.00 @ 16.80; German Pig, 15.15 @ 15.20, and Spanish, 17.50 @ 17.80. Copper is quiet at 67 @ 76. Tin is steady at 94 @ 93, and Spelter nactive at 15.75 @ 16.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, May 8, 1881.—*Iron.*—The market has been inactive and even listless, week after week passing by without receiving the orders expected. Everybody had been waiting for the spring trade, and now the latter also forsakes us; it is difficult to define the situation as it is, for we can hardly believe that there are not some requirements. Perhaps consumers are holding back in expectation of some further decline in prices. Meanwhile a good many works in Austria are trying to get under way consolidations with others to end, no doubt, in combinations by groups, in Styria, Bohemia and Hungary, but this ought to have been done sooner; we are indeed afraid that it is too late now. There is the competition from abroad which will disturb similar plans. The trade in Pig Iron is at a standstill in Austria for the moment; the demand for Merchant Iron is only limited, the sales effected being insignificant indeed; only a few works form an exception, being specially favored. Building develops very slowly, and requires so far but little material. Sheet Iron is also neglected. Iron has been dragging, but prices have been upheld. We quote toward the close: Pig Iron, 44 @ 52 florins per ton; Merchant ditto, 90 @ 115; Sheet ditto, 155 @ 180, and Pillars, 115 @ 118. *Metals*—Have been dull; we quote Copper, 74 @ 80; Tin, 110 @ 115; Lead, 20.50 @ 22, Spelter, 20.50; Sheet Zinc No. 9 to 26, 25.75; Antimony, 78 @ 80; Green Vitriol, 4.50; Blue ditto, 27.50 @ 32; Minium, 27 @ 27.50; Nickel, 4.50 per kilo., and Bismuth, 11 per ditto.

HOLLAND.

(Koch & Vlierboom.)

ROTTERDAM, May 10, 1881.—*Tin.*—Not much has transpired during the week, but prices are higher. We quote: Banca, 53 guilders per 50 kilos., and Billiton, 52.75, both on the spot. The next government sale will come off here on the 31st inst., when 23,500 slabs Banca will be offered.

PRICE OF BANCA TIN SINCE 1874.

	1874	1875	1876	1877	1878	1879	1880.	1881.
Jan. 1..70	57¼	50	45	40¾	38½	54¾	55¼	
Feb. 1..70	56¼	50½	43½	40	36¾	58¼	54	
Mar. 1..62	54	50¼	43¼	40½	40	55½	53	
April 1 53	51½	50	42¾	40	43	52¼	53¼	
May 1..57	50¾	49	42½	39½	40¾	50¾	52¼	
June 1..58½	50	45½	42½	39½	39½	43½	.....	
July 1..60	50¾	46¼	42½	39¼	39	49	.....	
Aug. 1..56½	48¾	44	41⅝	39½	38½	56	.....	
Sept. 1..57	51	43	40½	37¾	41¼	54½	.....	
Oct. 1..56½	52¼	42½	40¼	35¾	45	52	.....	
Nov. 1..58	52¼	44½	43	37¾	57	54½	.....	
Dec. 1..58½	51	44¾	41½	39	56	56½	.....	

The government returns for the months of January and February are as follows:

EXPORT OF TIN FROM HOLLAND.

	For February.			For 2 months.		
To	1881. T'ns.	1880. T'ns.	1879. T'ns.	1881. T'ns.	1880. T'ns.	1879. T'ns.
Germany	220	336	380	475	551	601
England	26	567	10	210	685	10
Belgium	287	390	182	389	678	271
France	1	91	26	15	143	43
Hamburg	68	80	33	87	166	40
The U. States	10	46	10	10	166	90
Oth'r countries	39	59	3	66	61	3
Total	651	1569	644	1252	2452	988

SPAIN.

(Iberia.)

HUELVA, Andalusia, May 3, 1881.—*Copper.*—The ore production of the Rio Tinto Mining Company has been last year 915,157 tons, against 906,600 tons in 1879. The amount of ore sold in 1880 has been 277,500 tons, against 243,241 in 1879, while the company has worked 637,567 tons, against 663,359. Of pure Copper, the company produced in 1880 8559 tons, against 7179 in 1879. Gross receipts reached the large amount of £611,340, against only £443,930 in 1879. While this has been the case, the company has succeeded in converting its old 7 % debt into a 5 % one. The balance sheet of the company exhibits a capital of £2,250,000; the hypothecated indebtedness is £4,261 840. There are other creditors besides to the amount of £478,331. Out of the gross receipts there was paid in the shape of interest on the debt £220,428; other interest, £45,536; expenses, £37,934; toward the sinking fund, £92,404, and written off on machinery for supposed depreciation, £45,000. In this manner there finally remained on hand an available cash balance of £181,782 against £114,418 the previous year, out of which the shareholders were paid an 8 % dividend, *i. e.*, £180,000, against only 5 % the previous year. The result greatly exceeds the expectations that had been entertained.

EAST INDIES.

(Schmidt, Kustermann & Co.)

PENANG, April 12, 1881.—*Tin.*—Sales during the fortnight have been limited in extent, Europeans taking 3080 piculs at $26.75 @ $26.95, and natives 2000 piculs at $27.05 @ $27.20, and finally at $26.95. Receipts were 5400 piculs, leaving stock on hand in Bazar of 4000 piculs. Chinese took a parcel of 700 piculs at $27.05 @ $27,10, which is at the same time the closing figure. *Exchange*, 4 months, bank, has risen from 3/9⅞ to 3/9½.

LABOR AND WAGES.

The strike at the Morrell coke works of the Cambria Iron Company still continues, with but little prospect of a settlement. The drawers held a meeting on Monday and decided to stand out for their demand. The miners will stand out with the drawers. From all that we can learn about the difficulty, the advance demanded by the drawers is just and reasonable, and ought to be granted. The ruling price throughout the Connellsville region for the larger ovens, such as are in use at Morrell, is 70 cents when the operators level the oven, and 80 cents when this work is done by the drawers. The Cambria Company have been paying but 70 cents and requiring the drawer to level his ovens.—*Reynoldsville Courier.*

At a large meeting of the Trades Assembly, held in Buffalo, May 10, delegates from several new unions were in attendance. The assembly represents 8000 members. Delegates from the Bakers' Union stated that they were on the eve of a strike, and asked the approval of the assembly in urging all union men to adopt the same action toward employing bakers as was taken in New York city. The assembly unanimously voted to support the bakers and to "Boycott" those who do not pay the union prices. The assembly also resolved to "Boycott" Perry & Co., the Albany stove makers, because they employ convict labor, and also the Erie stove makers who resist the union prices; also Breitiveizer & Co. and Burns & Laurbart, cigar manufacturers.

One hundred and seventy hostlers of the various stables of the Metropolitan Street Railway, Boston, struck for an advance of $2 per week. They have been getting $8. The president of the company offered them an advance of 1 per cent., making their wages $8.08 per week. It is rumored that men at the Warren street line have been successful and will get the $10 demanded.

A Wellsville (Ohio) dispatch says that fears were entertained of another general strike on Monday among the coal miners at Salineville. The men are now receiving 65 cents, but demand 70, and it is reported that unless the increase is granted a strike will be the result.

The report that all the mills in the Mahoning Valley would shut down on the 1st of June, on account of anticipated difficulty in the matter of signing the scale, is not true.

Committees of the Pittsburgh manufacturers and the Amalgamated Association met on Wednesday to discuss the scales presented by the latter.

Ward's glass-house, on the South Side, Pittsburgh, until recently manufactured chimneys exclusively. It will be remembered that the chimney and window-glass houses will shut down on June 1. Ward's men, however, it is said, will work on to June 15. The outside workmen say that if they do not close down on June 1, all the employees will be marked as "black sheep."

The strike at the Kittanning (Pa.) Furnace is over. The terms agreed upon are these: Top fillers get $1.90 per day each; former wages, $1.50 and $1.75; bottom fillers, $1.50 and $1.60; former wages, $1.40 and $1.50; casting-house men—keepers, $1.95; helpers, $1.55 and $1.60; former wages—keepers, $1.85; helpers, $1.45 and $1.55. These terms are to be in force six months, even though iron should come to $15 per ton. But in case iron should rise, the men are to receive 5 per cent. of the rise.

Private Brands of Tin Plate.

Our readers will find many points of interest in the following letter, although the press comments to which reference is made, and from which quotations are taken, were published in full in our last issue. Coming, as it does, from those who know practically whereof they speak, and expressing views in accordance with the ground already taken by *The Iron Age*, it cannot fail to command the attention it deserves. We commend it to the consideration of our readers:

PHILADELPHIA, May 21, 1881.

To the Editor of The Iron Age.—DEAR SIR: We have read your editorial in the issue of May 19 in reference to the circular of the Baltimore packers, and your paper is certainly entitled to the thanks of importers and consumers in laying facts before them which cannot be disputed.

Consumers, however, are very much to blame for the present state of affairs, as they have had an opportunity in the past year to read all that has been written on the subject of "private brands" and inferior plates in your valued journal.

There are but few consumers to-day, we regret to say, who have taken a decided stand to purchase no private brands, and, until they do this, they must expect to be imposed upon.

It was formerly the custom, when importers purchased plates on the other side, to oblige them to take 10 per cent. of the purchase in wasters. As the difference between a prime plate and a waster varies often from 25 cents per box to $1.25, according to the sizes and qualities, the question arises, Why is it now so difficult to obtain the wasters? Let the private brand business be stopped and there will be no difficulty in being able to purchase these plates.

Not many months since one of the owners of the "B V" coke plate works was in our office and complained "that while their brand was used as a grade, they had always endeavored to keep up the standard, not only in quality of the iron, but in the weight, and were expected to meet prices of inferior qualities." Consumers demanded cheaper plates, and manufacturers, at the demand of buyers, have used inferior iron, deteriorating the quality, and also, in some cases, have rolled their plates light, thus making the Custom House duties less.

Under such circumstances can there be much encouragement for a maker of brands like the "B V" plate to keep up his standard? The *Ironmonger* of April 16 publishes a communication from one of the Cardiff newspapers, and states that "the writer is known to hold a responsible position among the tin-plate workers." He writes as follows:

"We know of a firm considered to be of good reputation using over 200 private brands for the only purpose of encouraging buyers to deceive customers. We will suppose that orders are sent for "B V" grade. If the owner of this brand, who is no less than the honored Mayor of Swansea, refuses to sell at the buyer's quotation, he will go to another manufacturer and ask for a plate of equal quality to the "B V," which might have been very differently manipulated and at the same time of a much inferior class of iron, which will not be detected until in the hands of the consumers. Only this week it was reported to us of a new manufactory starting on a most economical scale in doing away with the tin-house superintendent, and sending to another works to borrow an assorter to look over the first lot that were sent out; then, of course, after that any class of plates might be sent away."

We think such a statement as this, that comes from a reliable source, ought to open the eyes of consumers as to what is being done by one alone of the many manufacturers of private brands. Take, for instance, the well-known charcoal brands of "Melyn," "Talbot," "P. S. & Co." and "L. P. L." The makers of these plates have for years sustained their reputation as to quality of iron.

The "Melyn" grade to-day is being used by some importers as a grade to quote on, and plates inferior in quality to "Melyn," &c., are now being shipped almost constantly under this grade. It cannot be justly contended that if the market value of the four brands mentioned is to-day 21/ in Liverpool, that a brand costing 18/ should be sold as their equal. But we assert that this is being done, and, furthermore, that it is almost impossible to sell strictly "Melyn" grade plates at what it costs to import them, save only to those customers who know their value and are willing to pay a fair price for them. The same system of quoting is being applied to other bright and roofing plates, and we are satisfied that there are cokes to-day being sold under private brands as charcoal plates. No system that admits of the same coke plate being sold under a half dozen names, and at a half dozen different prices, can be regarded in any other light than as a positive injury to the consumer, to say nothing of those engaged in the importation of these brands. We cannot better close this article than to ask you to read the inclosed article from the *Ironmonger* of April 16th, headed "Brands of Tin Plates," in which the *Ironmonger* states: "The point, however, as to which they (the manufacturers of tin plates) are chiefly concerned is the disregard of established brands now displayed by American consumers."

These few words cover the whole ground, it seems to us, and the sooner consumers (upon whose purchases must depend the reputation of their goods) take hold of this matter of private brands, the sooner they will be able to get a better quality of plates at a fair price.

Yours truly,
MERCHANT & Co.

A curious magnetic property of the meteoric iron of Santa Cattarina (Brazil), has been lately observed by Prof. Lawrence Smith, of Louisville. Small detached fragments, not weighing more than 0.1 to 0.2 gr., were very weakly affected by a magnet; but on being flattened on a piece of steel with a steel hammer, they became very sensitive to it. By heating red hot, the particles were made to be still more easily attracted than by flattening. The meteoric iron in question contains 66 iron, 34 nickel.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The Putnam Machine Company, of Fitchburg, have closed a contract with a California railroad for the largest order of railroad tools ever taken by the company. The order includes engine lathes, double headed driving-wheel lathe, one driving-wheel lathe, one car-wheel borer, one 13-inch stroke slotting machine, one 150-ton wheel press, and one 300-ton wheel press, a 14-inch stroke shaping machine, two goose-neck drills, bolt cutters, one 100-horse-power steam engine, six Putnam forges and many smaller tools.

The Turners Falls Company have elected the following officers: President, C. A. Stevens, of Ware; treasurer, William P. Crocker; clerk, Austin DeWolf; directors, B. N. Farren, ex-Gov. Talbot, C. T. Crocker, Josiah Gates, Charles A. Stevens, Edwin Buckley, R. N. Oakman, George F. Fay, A. DeWolf and J. Rogers.

The recent purchasers of the Gaylord Mfg. Co., of Chicopee, have formed a new organization under the name of the Ames Sword Company, with a capital of $150,000. The officers are A. C. Woodworth, of Chicopee, president, and George M. Barnard, of Boston, treasurer. The principal business is to be the manufacture of swords, but the company will continue the brass foundry business heretofore carried on by the Gaylord Company. The price paid the Gaylord Company was $105,000.

The frame of the pistol shop at Hatfield is up, and it is expected to have the roof on and hang the shafting in a week or two.

There is talk of forming a cutlery company at Westfield, under the management of Shelbourne Falls and Greenfield parties. To effect this about $10,000 will have to be invested by local capitalists.

The Belcher & Taylor Agricultural Tool Company, of Chicopee Falls, are to build an addition to their forging shop. B. & J. W. Belcher contemplate building a new foundry, and possibly a blacksmith shop.

CONNECTICUT.

Rogers & Bro., the well-known manufacturers of silver plated ware, at Waterbury, are running full time and employing their full complement of hands on their standard goods—flat ware—including spoons, knives, forks, ladles and fancy articles generally. They are constantly devising new patterns in these goods.

The R. Tomlinson Spring and Axle Works, of Bridgeport, were established in 1852, and are the only works in the city engaged in the manufacture of axles. The factory has a frontage of 400 feet and a depth of 100 feet, and power is furnished by an 80-horse engine. It employs 100 hands in all departments, and turns out 600 pairs of elliptic and side springs per week. These are made of both Swedish and English steel in all the different grades and sizes. Specialties are the J. B. Brewster Patent Cross Spring and the English Collinge Axle. The works make their own drafts and do their own forging. The reputation which the works enjoy of turning out first-class goods, keeps them constantly working at their full capacity on orders from all parts of the East and West. Just now they are full of business and are running overtime in certain departments.

NEW YORK.

Haight & Clark have purchased the foundry business formerly carried on by A. Winterburn at Nos. 16 and 18 Detroit street, Albany, and will continue the manufacture of small gray iron castings, in addition to machinery and pattern castings.

The large iron, steel and brass foundry at Champlain, formerly owned by H. W. Clark & Co., now in the hands of M. V. B. Stetson, as trustee, is advertised for sale on May 25. It is rumored that negotiations are being made with Messrs. Weed, Williams and others that it may become an annex of the Chateaugay Iron Company.

The failure of the Napanock Rolling Mill Company, of No. 28 Platt street, New York city, and Napanock, Ulster County, N. Y., is reported. The company were organized February 1, 1880, with an authorized capital of $25,000, but was never successful, and has been run at a loss since it started.

NEW JERSEY.

Dr. C. J. Eames, of New York, is about to start the Elizabethport Rolling Mill with petroleum as fuel. It has a daily capacity of about 30 tons of rolled iron. His Titusville works are closed at present, but will be started again when merchant iron is higher.

PENNSYLVANIA.

We have the following letter from the L. B. Flanders Machine Works, Philadelphia:

PHILADELPHIA, May 20, 1881.

To the Editor of The Iron Age.—DEAR SIR: A statement recently published in regard to the Greenwood Planer Chuck says: "Hereafter no device can be used for planing curved surfaces, or dressing concaved or convexed bodies upon the common planer, without interfering with the Greenwood patent."

This statement is erroneous and calculated to deceive the public. We have for many years past made a Radius Link Planer, and now are actively engaged in the manufacture of it, having orders on file. It has always given the best of satisfaction, most excellent results being accomplished. We have a long list of railroad companies, locomotive builders and others who have them in use.

This planer was patented July 22, 1856, and, having long since expired, of course is public property and can be sold very much cheaper than those protected by patents, allowing us, at the same time, a reasonable profit.

We are prepared to fill orders for this device, and will furnish any information, description of its workings, photographs and price, upon application.

Yours truly, H. C. AYER,
For L. B. Flanders Machine Works.

Stokes & Parrish, Philadelphia, continue to be actively engaged on their specialties in hoisting machinery. For Johnstown, they are building two coal mining hoists; for the Glamorgan furnace, one furnace hoist; for the Alabama Iron Company, one furnace hoist; and for a firm in Memphis, Tenn., one large slope engine for hauling coal from the river to the top of the bluff. In hydraulic elevators they are building one freight and passenger for James Scott, Detroit; one passenger for Peter Wright & Son, Philadelphia; one for Darlington, Runk & Co., and several for parties in Baltimore, besides a larger number of smaller elevators for all classes of work.

George Griffith, manufacturer of shovels and coal hods, has recently purchased a lot, 277 x 114 feet, at the northeast corner of Eighth and Jackson streets, Philadelphia, and on a portion of it is now having erected a four-story brick factory building, 114 feet on Eighth street by 142 feet on Jackson street. On other portions of the lot will shortly be erected a galvanizing and heavy forging building, a stable and several dwelling houses.

Within the radius of a couple of squares in West Philadelphia nearly 1300 men are working from dawn to dusk, and some of them all night, on rolling stock for American and European use. At Allison's 1000 men are putting their energies into house, coal, gondola, flat box, dump and other kinds of freight cars, and so great is the demand that, with the orders now on hand, the large force could be kept fully employed until November next. Many of the cars now in course of construction are destined for the Texas Pacific Railroad, while others are going to New York, New England, out West and, in fact, all over the country. At Messrs. J. G. Brill & Co.'s great difficulty is found in keeping pace with the demand. In the shops are narrow-gauge cars for roads in Ohio and Missouri and several for the Connotton (Ill.) Valley Railroad. The first order for street cars ever received from Spain was shipped a few days ago, and at the same time a consignment was forwarded to Germany. The stir in Mexican railroads has resulted in some orders for open excursion cars, and Brazil has taken a fancy to the United States pattern of mail cars. Several of the latter have also been sent to Central America. A number of cars went recently to a New York railroad which has never previously placed its orders outside of that State. Ten caboose cars for the Texas Pacific Railroad, the balance of an order of 20, are approaching completion; 15 summer cars for the Market Street Railway are ready to leave the shops, and a number of one-horse cars for the reorganized West End road are being fast put together, and some double-decked cars for the steam beach roads, at Cape May, will be ready in time for the seaside season. These are the first double-decked cars ever built for use in this country, although they have long been on foreign roads. As in the case of the freight-car trade, the orders already placed for steam and street railway traffic will keep the force employed until autumn.

The Tyson Engine Company, Philadelphia, have stopped selling the "Vase" engines, and now intend manufacturing a remodeled style in order to incorporate certain improvements, which, they believe, will make the engine more desirable without any change in their non-explosive system of steam generation. It will have a governor and an arrangement which (being attached by a cord to the treadle wheel of an ordinary sewing machine) is said to give the operator entire control of the starting, stopping and speed of the machine, irrespective of the speed of the engine, by the pressure of the feet upon the treadle. It will have the advantage of more power, where more fuel is used, and run as economically as the "Vase" engine, where less power is required. Gas, kerosene or gasoline (naphtha) may be used as fuel. The new engine will be ready for the market about July 1.

The foundation under a Lewis Kirk hammer in the steam forge of the Reading Railroad Company, Bingaman street, between Seventh and Eighth, Reading, is being removed. The foundation, which consists of timbers about a foot square, cribbed and extending into the ground some 10 feet, was laid 35 years ago. While the upper timbers were rotting away, the lower ones are apparently as solid as the day they were placed in. A foundation of stone, with only one set of timbers, will now be laid.

Grander, Rogers & Co., proprietors of the first flat foundry at Royersford, are making arrangements to have a brick foundry built, 75 x 100 feet, on the vacant tract of three acres adjoining their present foundry. The foundry they are now occupying will be converted into a wareroom for the storing of stoves.

The E. & G. Brooke Iron Company are erecting at the nail works a drying house, 94 x 30 feet, in which to keep staves and other materials used in the manufacture of nail kegs, in order that they may become thoroughly seasoned before being used. Davis Reed designed and has charge of its erection.

PITTSBURGH AND VICINITY.

The following is a summary of the business of Pittsburgh last week: Iron production, 7500 tons; pig iron, 8000 tons; Bessemer steel, 4000 tons; open-hearth steel, 1000 tons. Glass.—Tableware and lamps, 1100 tons; lamp chimneys, 78,000 dozen; reflectors, 1000 dozen; window glass, 540 tons or 24,000 boxes. Coal.—Shipments by river, 7,000,000 bushels; by railroad, 1,500,000 bushels. Petroleum.—Sales and resales 663,000 bbls. Live stock at East Liberty.—Cattle receipts, 5335 head of through and 1548 head of local; hogs, 3750 head; sheep, 17,000 head. Coke produced in the Connellsville region, 60,000 tons.

Bryce, Walker & Co., glass manufacturers, will commence removing the pots from their old furnace the latter part of this week, preparatory to converting it to the Gill model. They hope to complete the work in a month or six weeks.

Moorhead & Co., of the Soho Iron Mills, are adding a muck train and sheet rolls to their establishment, to increase their product of the heavier line of sheet iron.

Metcalf, Paul & Co., have been pushing the work of rebuilding their works, the Verona Tool Works, recently burned, and will soon be ready to commence operations again.

OHIO.

Mr. L. E. Cochran, of the Niles Iron Co., kindly informs us that there is no truth in the rumor that the portion of their mill still remaining at Niles has been purchased by parties who will build eight puddling

DRILL BRACE.

This is a 10-inch sweep Brace, with a gear-wheel speeded about three to one, to be used for drilling and also for boring in places where there is not room to revolve the Brace Sweep. By an ingenious device the large gear wheel can be put on at three different angles with the Brace Sweep, adapting it for use in narrow or cramped places. When not needed the gear wheel can be removed in one second, leaving a plain Brace. This Brace is made of steel, and is heavily nickel-plated, with rosewood handle and lignumvitæ head. The jaws are of forged steel and will center and hold firmly Round Twist Drills from 1/8 to 7-16 of an inch in diameter. Also, Square Shank Bits and Drills of all sizes. Also, Square and Flat Screw Driver Bits. In fact, it will hold perfectly tool shanks of any size or shape. There is no other chuck in existence which will do this. It is our purpose to furnish everything in the line of Bit Braces and Breast and Hand Drills of a style and quality superior to anything else in the market.

Price of Drill Braces per dozen, $36.

Same discount as Breast Drills.

MILLERS FALLS COMPANY,

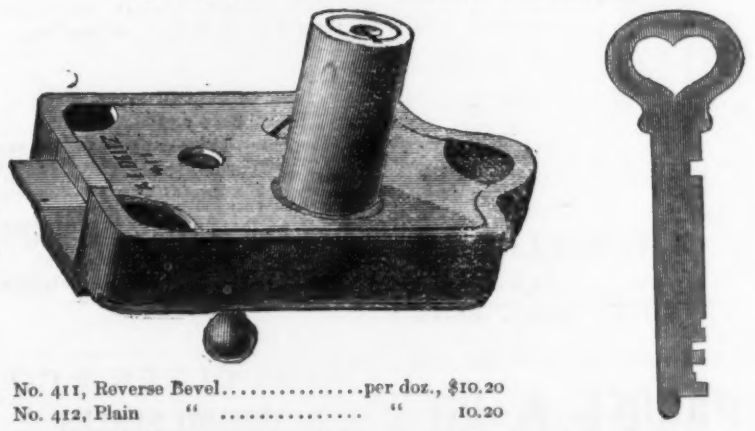
74 Chambers Street, New York.

A. E. DEITZ,

SCREEN DOOR LATCH,

For Screen Doors, Drawers, Cupboards.

CUT FULL SIZE.



No. 411, Reverse Bevel.....per doz., $10.20
No. 412, Plain " ..... " 10.20

Durrie & McCarty, Agents, 97 Chambers & 81 Reade Streets, NEW YORK.

HEATON & DENCKLA HARDWARE CO.,

Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
HP NAIL COMPANY'S Wire, Steel, Iron and Brass Nails and Barbed Nails.
TEELE & SONS' Wrought Handle Sad Irons.
EXCELSIOR MILLS. Genuine Turkish Emery.
BROWN & BRO.'S Silver Plated Spoons and Forks.
GAYLORD MANUFACTURING CO.'S Till, Chest and Cupboard Locks.
AMES' Genuine A Chester Emery.
COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
AMERICAN MACHINE CO.'S Fluters, &c.
STUART PETERSON & CO.'S Tinned and Enameled Ware, &c.

Also a large line of Heavy and Shelf Hardware.

HUNDLEY & HANKS,

PROPRIETORS OF

NORTH CAROLINA HANDLE CO.

MANUFACTURERS OF

Handles and Spokes,

79 Reade Street and 97 Chambers Street, - - - - NEW YORK.

HARDWARE COMMISSION MERCHANTS.

LAFLIN MFG. CO., Westfield, Mass.

Manufacturers of

PAT. IMPROVED STEAM HEATING APPARATUS.

LAFLIN MFG. CO.'S

Pat. Single Iron Plane

Made of extra quality iron. A practical labor-saving tool. Cuts against the grain equally as well as with it. Can be adjusted instantly to cut a coarse or fine shaving, and excels any double iron plane ever produced.

GREEN'S PURE SILICA FIRE BRICK,

MADE BY

LACLEDE FIRE BRICK MANUFACTURING CO.,

SPECIALLY ADAPTED FOR

Pernot and Siemens Open Hearth Steel Furnaces and for Glass Furnaces.

Office, 901 Pine St., St. Louis, Mo.

"UNION" Door and Gate Spring.

SIMPLE, DURABLE AND ECONOMICAL.

The Objectionable Features of Other Springs Entirely Overcome.

We Make Four Sizes, viz.:
No. 9, For Screen and Light Doors.
No. 8, For Medium Weight Doors and Gates.
No. 7, For Large Doors and Gates.
No. 6, For Store Doors and Extra Heavy Gates.

As there are several Springs similar in appearance, but without our improvements, upon the market, see that you buy only the

"Union" Adjustable and Reversible.

MADE ONLY BY

The Edwards Manufacturing Company,

DETROIT, MICH.

An agent wanted at every jobbing center.

PRIZE MEDALLISTS:

Exhibitions of 1862, 1865, 1867, 1872, 1873, and only award and medal for Noiseless Steel Shutters at Philadelphia, 1876, and Paris, 1878.

CLARK, BUNNETT & CO.,

LIMITED,

Late CLARK & COMPANY,

Original Inventors and Sole Patentees of

Noiseless Self-Coiling Revolving

STEEL SHUTTERS

FIRE AND BURGLAR PROOF. ALSO IMPROVED

ROLLING WOOD SHUTTERS

Of various kinds. And Patent

METALLIC VENETIAN BLINDS.

Endorsed by the

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Send for Catalogue.

Office and Manufactory,

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NEW MAKE OF MINE LAMP.

LEONARD BROS., Scranton, Pa.

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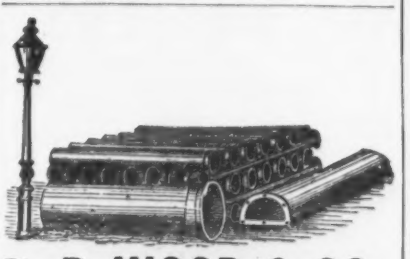
FILTER.

CROCKER FILTER CO.,

174 High St., Boston, Mass.

W. E. PUFFER, General Selling Agent for the States of New York and New Jersey—5 Murray street, New York.



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Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS,

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

No. 35 — 3/16 × 1 1/2

BROWNING, SISUM & CO., 85 Chambers St.,

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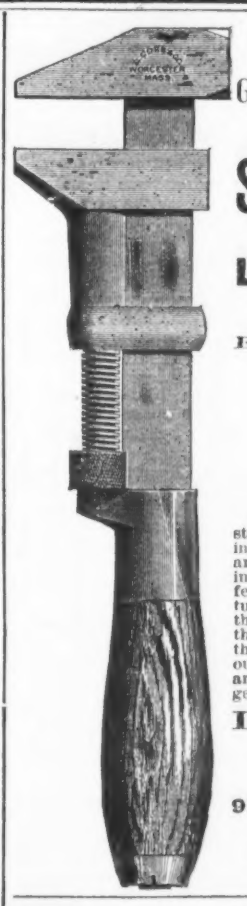
Belt Hooks, Cotters, Spring Keys, D Rings, Staples, and everything pertaining to wire bending. Factory, BROOKLYN.



L. COES'

Genuine and Mechanics

PATENT

Screw Wrenches

MANUFACTURED BY

L. COES & CO.,

Worcester, Mass.

ESTABLISHED IN 1839.

Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. None genuine unless stamped

L. COES & CO.,

Worcester, Mass.

Warehouse,

97 Chambers and 81 Reade Sts.,

NEW YORK.

DURRIE & McCARTY,

Sole Agents.

CHAMPLAIN Forged Horse Nails.

MANUFACTURED BY THE

NATIONAL HORSE NAIL CO.,

Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

A full line of "CHAMPLAIN" and "NATIONAL" Nails always on hand at our Warehouse,

97 CHAMBERS AND 81 READE STREETS, NEW YORK.

DURRIE & McCARTY Sole Agents.

The 1881 Pennsylvania Lawn Mower.

OUTSTRIPS ALL COMPETITORS. PREMIUMS TAKEN OVER ALL OTHER MOWERS.

EVERY MACHINE WARRANTED TO WORK AS REPRESENTED.

Also Manufacture the

BEST 10-INCH FORWARD CUT LAWN MOWER in the MARKET, named "QUAKER CITY."

For descriptive catalogue and prices write

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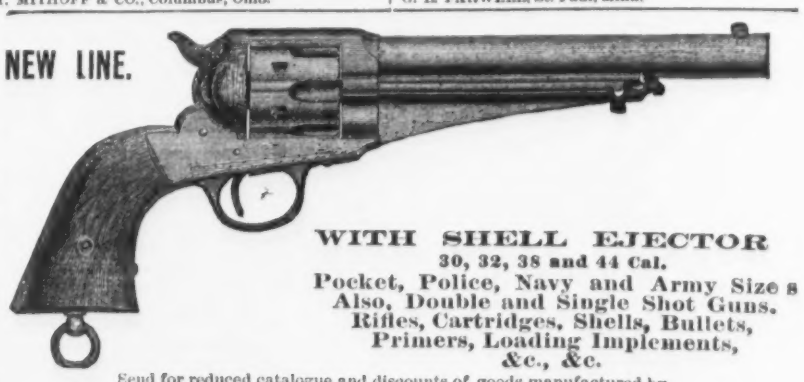

WITH SHELL EJECTOR

30, 32, 38 and 44 Cal.

Pocket, Police, Navy and Army Sizes

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Send for reduced catalogue and discounts of goods manufactured by

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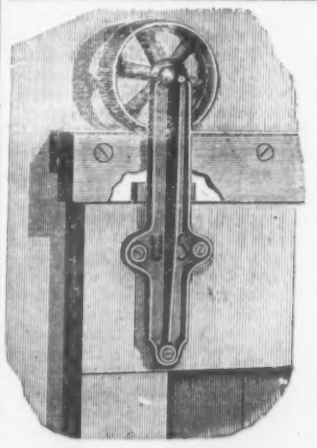


THE U. S. WOOD TRACK BARN DOOR HANGINGS.

Patented April 13, 1869: Reissued Jan. 11, 1881. Reissued April 19, 1881.

This patent covers all rail with a recess in the under side.

By using these Hangers you save the cost of iron rail.

They cannot be thrown off the track.

We also manufacture

Anti-Friction and Check-back Hangings, Rail, Stay Rollers, &c.

Send for price list.

MEDINA MANUFACTURING CO.,

SAMSON & SWETT, Props. Medina, N. Y.

furnaces and start the works at once. The company now have their muck mill and six double furnaces in operation at Hazelton, and their foundations in and work commenced on additional furnaces. They will move their 10-inch mill this week, and immediately after their bar, guide and sheet mills.

Cox & Prentiss, manufacturers of machinists' tools, Cleveland, employ 35 hands and report trade good. They have just finished a milling machine for shipment to England, the weight of which is 12,000 pounds. They have orders ahead which will run their establishment to August next.

Messrs. Emerson, Smith & Co., saw makers, Beaver Falls, are putting in a new 130-horse-power engine, made for them by the Buckeye Engine Co., of Salem.

At Brown, Bonnell & Co.'s, Youngstown, what is known as the Compromise Mill is shut down, owing to the orders being light. The balance of their works, including the Phœnix and Falcon furnaces, are working.

Webster, Camp & Lane Machine Co., Akron, are making rapid progress with the extensive addition to their works.

The Boyer Elevator Company, 51 Center street, Cleveland, which consists of W. F. Boyer and F. A. Edmonds, are running full time, with abundant orders, in the manufacture of their hydraulic elevators. These elevators are remarkable for easy running.

The Morse Bridge Works, Youngstown, are building a two-story addition for a pattern and templet shop, where the iron will be marked for punching.

Cuyahoga Falls Barbed Fence Company have been awarded the contract of fencing the entire right of way of the Ohio Central Railroad. They have made a contract with the C., Mt. V. & C. R. R. for transportation of 45 carloads of wire from Cuyahoga Falls to Centerburg.

The Cleveland Bridge and Car Works have just shipped a second iron 600-feet bridge to Winnepeg, Mass., for the Hudson Bay Company. They have also just finished a bridge for Brazil, S. A., and are turning out ten cars a day for the Buffalo, Pittsburgh and Western Railroad Company.

We hear that Massilon is to have a glass factory. The projectors are reported to be capitalists from Clyde, N. Y.

Howard Furnace, which makes warm blast iron, will blow in about June 1.

Dispatches from Steubenville, dated the 20th, state that the Alikanna Rolling Mill, near that place, has been sold to Messrs. Sharp and Daniels, the latter from Ohio. Arrangements have already been made to put the works in operation.

The erection of a new glass factory at *Niles will begin at once. This is a new* branch of industry in this section, but it promises well.

The question of the removal of the Ward iron establishments from Niles has, we learn, been settled by the decision of the owners to remove to New Philadelphia this summer.

Fifteen boiling furnaces at the N. Y. and O. I. and S. Mill, Ironton, are running single turn, filling orders for muck iron.

Olive and Buckhorn furnaces are again in blast, the former making hot and the latter warm-blast iron.

The Miller Company, Canton, manufacturers of the torrent steam pump, are running double turn with 40 men, making eight pumps per day, many of which go to supply the demand of agricultural engine builders throughout the country.

WEST VIRGINIA.

Hobbs, Brokunier & Co. have lit up their large 15-pot glass furnace, and made glass last week from it.

At the Central Glass Works, Wheeling, a new 10-pot furnace is going up and a large addition to the cutting-room is building.

Mr. W. H. Woodward, secretary of the La Belle Iron Works, has been elected president of the company in place of his father, the late S. H. Woodward. Mr. J. H. Woodward was elected secretary.

TENNESSEE.

The Atlanta Rolling Mill has failed, throwing out of work 450 operatives, to whom it owes $8000 aggregate wages for April. The operatives have attached the property, and a bill of sale has been granted by Judge Hillyer, of the Superior Court. The inventory of material and machinery has been taken and the mill is in the hands of a receiver. The cause of the suspension was the inability of the mill to negotiate its bonds in New York since the failure of the Citizens Bank, through which heretofore it has gotten money on its bonds in the metropolis.—*Chattanooga Times.*

H. O. Nelson, proprietor of the Ornamental Iron Works, Knoxville, writes that he is making large shipments of his work to the South. He is now breaking ground for a new shop.

ILLINOIS.

The North Chicago Rolling Mill Company increased its capital stock from $3,000,000 to $5,000,000 in order to consolidate with it the North Chicago Steel Company, which had a capital of $2,000,000. The stock was held by both companies, consequently the action taken was a legal formality made necessary by laws regulating corporations.

The two-story brick building Nos. 177 to 199 Mather street, occupied by the American Cutlery Company, was partially destroyed by fire on the morning of the 12th inst. The loss sustained on the stock and machinery was estimated at $25,000, and on building $10,000; the whole was insured for $69,000 in various companies. Contracts have been let for rebuilding and enlarging the works, and the company expect to be in complete running order by June 15.

The Peoria Plating Works (formerly J. S. Dunlap & Bro., now Dunlap & Brown) have just completed arrangements by which they are now prepared to manufacture plated ware on an extensive scale.

J. J. Steiger, of Peoria, manufacturer of every variety of small saws, reports business very good, and is constantly receiving numerous orders from all points. He also makes a specialty of manufacturing sickles and sickle sections, of which he makes every description on the market.

S. B. Hart & Co., Peoria, proprietors of the Union Grain Drill Works, who were recently burned out, have now completed their new works—a new brick structure—the dimensions of which are 210 x 160 feet, increasing their capacity one-third more than it was, and say they are driven to fill orders for the Union drill. They are employing from 150 to 200 men constantly.

The Danville Foundry and Machine Works are turning out from 3 to 5 tons of castings per day. They will shortly add new machinery to their works, enabling them to manufacture portable steam engines on an extensive scale.

Messrs. H. W. Hill & Co., of Decatur, manufacturers of Hill's champion hog ringer and implements and other agricultural hardware specialties, report business very satisfactory. They estimate, on a basis of 100,000,000 rings sold since manufacturing, they have used 555,500 pounds of wire, measuring 3408 miles and filling 27 cars.

The Joliet Wire Company, a new company who have recently started up, are turning out from 5 to 7 tons of wire per day, employing 35 men.

Messrs. H. B. Scott & Co., Joliet, are at present employing 170 men, a portion of which are doing double turn. They are sending out two car loads of fence wire per day, using about 36,000 pounds of wire, also making fence staples at the rate of 50 kegs per day, and are considerably pushed to fill their orders.

Jacob Haish, of Chicago, having paid into court $16,737.01, in accordance with the requirements of the interlocutory decrees entered April 25, 1881, in the two cases pending against him in the United States Circuit Court of that district, announces that he continues the manufacture of "8" barb steel fence wire, having thus protected his customers.

Active preparations are being made to establish a glass factory in East St. Louis. We are informed that application has been made to the Secretary of the State for articles of incorporation, and that there is some chance of the site of the works being changed from East St. Louis to Belleville.

Ottawa has raised about $25,000 of the $30,000 necessary to establish a flint glass works in that city, and the success of the project is assured.

The Gray Iron Company, Chicago, has increased its capital to $50,000, and is constructing a large building for foundry and machine shops on land of its own on the corner of Erie and Kingsbury streets.

Several pile drivers with engines are being constructed by the Vulcan Iron Works Co. for the Illinois Central Railroad.

The S. L. Bignall Hardware Co.'s Works, at St. Charles, are now so crowded with business that they are talking of commencing night work.

The Excelsior Iron Works, Chicago, are furnishing a 50 horse-power boiler for Rhoades, Utter & Co., of Rockford; a battery of four boilers 48 inches diameter, 27 feet long, and a horizontal engine for the Union Pacific Railroad, and are in receipt of a second order this spring for an 80 horse-power boiler from the Republic Iron Company, of Marquette, Mich.

The Chicago Steel Works have just received an order from a Moline firm for 10,000 of their patent plow beams.

Tafft, Davidson & Co.'s Malleable and Gray Iron Works, at South Elgin, have, since the floods which carried away the mill dams, been fitted up to run by steam, as also have the South Elgin Fork Works.

INDIANA.

The Milburn Tubular Axle Works, at South Bend, were partially destroyed by fire last week. The damage is estimated at about $2500 on the building. The stock and machinery were only water damaged and the whole is fully covered by insurance. The works are owned principally by George Milburn and his son Charles Milburn.

The fourth building of the Indianapolis Car Works is going up. The ground, perfectly bare three weeks ago, is now covered with 600 feet of buildings 150 feet deep and two more, 550 by 60, are to come.

Messrs. Wm. Douglas & Son, of Lafayette, manufacturers of wood pumps, are very busy at present, having as many orders as they can conveniently fill; they employ constantly 30 hands and have a capacity for turning out nearly 200 pumps per day.

Messrs. Harding, Barbee & Co., of Lafayette, manufacturers of wrought iron fencing, &c., say they are pushed to their utmost capacity at present; they will shortly increase their facilities, and will begin to manufacture and put on the market, the Harding Flexible Emery Wheel, having many advantages over most wheels in its construction.

B. F. Biggs, proprietor of the Lafayette Pump Works, reports that he is driven to fill orders, and estimates sales to reach 2000 for this year; is employing from 25 to 30 men constantly, and has a capacity for turning out 140 finished pumps a day.

MISSOURI.

The works of the Missouri Car and Foundry Company, also nearly all the other industrial establishments in St. Louis that were flooded by the recent rise in the river, have been relieved of the water, mud and filth that had deluged them, and have resumed their usual busy appearance.

The new repair shops of the Pullman Car Company, now being built in St. Louis, near the Union Depot, will be the means of 200 or more workmen being employed there. These shops are to be used exclusively for repairing coaches belonging to the Pullman Company in use in that section of country and west of the Mississippi River, such repairs having heretofore been done at the company's shops at Detroit and other places.

Before the Laclede Rolling Mills start up again the old gear connections to the trains of rolls will be removed and independent power supplied to each by different engines.

MICHIGAN.

Mr. H. C. Wagg is now the manager of the Chompion Furnace at Menominee, Mr. Clark having resigned and gone to Thunder Bay, on the north shore, to open up some iron property. Mr. Wagg informs us that the furnace is running under check at the present time, owing to a scarcity of coal, and consequently is only turning out about 35 tons of pig iron daily, but he hopes to have it running in full blast in June. He is now having a set of coal kilns constructed at Section 12 on line of railroad; another at section 25, and will put another set at Bark River, or near there.—*Iron Post.*

The Peninsular Car Works are to be removed entire from Detroit to Adrian.

Preservation of India Rubber under Water.—Great losses are often experienced by the users of india rubber tubing, on account of the brittleness which it often acquires in use. A writer in *Dingler's Journal* gives an encouraging account of his success in remedying the difficulty by laying the pipes in water which is often renewed. Even the thickest and stiffest tubes remain soft and pliable, without any perceptible diminution of elasticity, and he has been unable to discover any trace of injurious change. For some uses he soaks the pipes in melted paraffine. When they are kept in water they undergo great changes of color, and upon cut surfaces they often appear greasy and bleached, but all the changes seem beneficial rather than otherwise. Thin rubber bands, however, often become so brittle that they can be easily rubbed into small pieces by the fingers.

A tricycle driven by electricity appeared lately in one of the streets of Paris. M. Trouvé writes of it to *La Nature*, stating that the tricycle was of English make and very heavy (55 kilogr.), and that he had adapted to it two of his small electric motors, fed by three of the secondary elements or accumulators of electricity, which serve for his polyscope. The vehicle, mounted by a friend of his, ran several times along the Rue de Valois as fast, at least, as a good ordinary cab. The total weight of the vehicle, with its rider, was about 160 kilograms, and the effective force produced by the two motors was 7 kilogrammeters. The experiment lasted an hour and a half. In view of the results, M. Trouvé has set about the construction of a motor which will produce as much as the two others, so as to obtain a greater velocity, say 20 to 30 kilometers an hour.

The Iron Age Directory

and Index to Advertisements.

EXCELSIOR LAWN MOWER

We make *Seven Sizes* of *Roller Mowers* and *Six Sizes* of *Side-Wheel Mowers.* We claim for our Mowers

Perfect Work, Light Draft and Simplicity.

We have received many first premiums in competitive trials with other Mowers, both in this country and abroad. We have special patterns of Mowers for export, meeting the requirements of every market. Our new Horse Mower is conceded to be the *Lightest* and *Best* Horse Lawn Mower ever made. N. B.—Horse and Hand Lawn Mowers are alike guaranteed in all respects. Send for Illustrated Catalogue. Address

CHADBORN & COLDWELL MFG. CO.,
Newburgh. N. Y.

THE GLOBE MANUFACTURING CO.,
Successors to THE MIDDLETOWN TOOL CO.
Manufacturers of
HARDWARE,
INCLUDING IN GREAT VARIETY THE WELL-KNOWN
"Baldwin" Plane Irons.
(Every Iron of our make warranted a perfect cutter.) ALSO,
Galvanized Hammock or Boat Snaps and Gaff Topsail Self-mousing Ship Hooks, Harness Snaps, Baby Snaps, Washer Cutters, Pocket Wrenches, Amateur Lathes, &c.
MIDDLETOWN, CONN.
☞ Send for Catalogue and Discount Sheet.

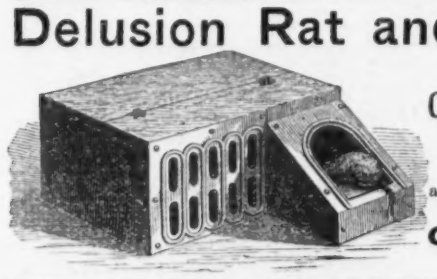
Torrey's Door Springs.
S. ROEBUCK & CO.,
Manufacturers,

164 Fulton St.,
NEW YORK.

Torrey's Patent
COG WHEEL

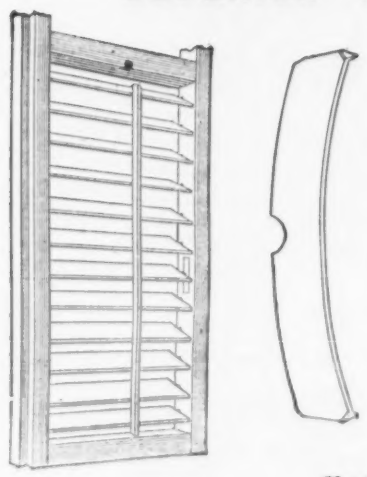
Ice Cream Freezers.
Torrey's Door Springs.
S. ROEBUCK & CO., Manufacturers,
164 Fulton St., New York.

Delusion Rat and Mouse Trap,



Manufactured by
CLAUDIUS JONES & CO.,
ERIE, Penna.
This is the only Self-setting Trap on the market, and the most successful.
All orders direct to
CLAUDIUS JONES & CO.,
ERIE, Penna.

BENTLEY'S
Perfect Blind Slat Holder.
Patented.
SUPERIOR TO ALL OTHERS.



For tightening the Slats of Window Blinds and holding them at any required angle.

The sunlight is let in or shut out at will.

The blinds are made a much better protection from cold, because when the slats are shut they are so kept by the Holder and cannot be moved by the action of the wind.

Noisy rattling of the slats is prevented.

The holder is securely held by its spring and the sharp points at each end.

As it is made of brass it will not rust.

It cannot get out of order.

Its superiority over other holders is evident.

It requires no screws or nails to fasten it to the blind. Any one can apply it.

It cannot get loose or deface the blind as others do.

Retail Prices.

No. 1, For Outside Blinds, 5 cents each; 50 cents per dozen.
No. 2, For Inside Blinds, two for 5 cents; 25 cents per dozen.
At which prices samples will be mailed postpaid.

Trade Prices.

No. 1, $6.00 per gross; discount 50 per cent.
No. 2, $3.00 per gross; discount 50 per cent.

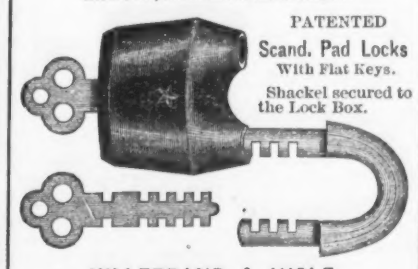
FOR SALE BY THE TRADE.

In case your jobbing house cannot supply you, orders will be promptly filled by

R. W. BENTLEY, Sole Manufacturer,
41 FOURTH ST., BROOKLYN, E. D., N. Y.

STAR LOCK WORKS.
ESTABLISHED 1836.

Trunk Locks, Pad Locks, Dead Latches, Door Springs, Trunk Stays, Keys, &c., &c.
110 South 8th St., and Sansom, bet. 8th and 9th, PHILADELPHIA.



PATENTED
Scand. Pad Locks
With Flat Keys.
Shackel secured to the Lock Box.
HILLEBRAND & WOLF.

LITTLE WONDER.

and Shaped Diamond Carbon Points, indispensable for Truing Emery Wheels, Grindstones, Hardened Steel, Porcelain and Paper Calender Rollers, Drilling, Planing, Molding, Millstone Dressing, and Sawing Stone.
J. DICKINSON,
64 Nassau Street, NEW YORK.

Grindstones, Emery, &c.

Walter R. Wood,
GRINDSTONES.
Berea, O., Nova Scotia, & other brands
283 and 285 Front Street, New York.

GEO. CHASE,
The largest manufacturers in the world of
OIL  **STONE**

Of all description.
107th Street and Harlem River.
Send for Illustrated Price List. NEW YORK.

McDERMOTT & BEREA STONE CO.,
Manufacturers of
GRINDSTONES,
Cleveland, Ohio.

OHIO GRINDSTONE COMPANY,
Manufacturers of
GRINDSTONES
Of All Kinds.
127 Superior Street,
CLEVELAND, OHIO.

NEWCASTLE GRINDSTONES
(ENGLAND).

Celebrated for their uniform quality and keen rasping grit, have now a world-wide reputation.
For prices apply to
R. ATKINSON & CO.,
Manufacturers,
Office, *Guildhall, Newcastle-on-Tyne.*

OHIO GRINDSTONES.
Superior Ohio Grindstones, manufactured by **P. L. Cole,** Constitution, Ohio, will be supplied to the Southern trade at lowest possible rates by
S. B. LOWE, Southern Agent,
Chattanooga, Tenn.

We offer you until further notice,
OUR HARD TIMES CHALLENGE
EMERY WHEEL,
at the prices and in the sizes given below. This Wheel is of a special grade, made for standard use upon cast iron edging. *It is fully warranted to be, in all respects, as good a wheel as any wheel made, and to stand as much speed, and as much use and abuse* as any wheel made, excepting *none.* Try it, and spite of your prejudice it will please you.
Terms, strictly cash, 30 days after shipment, and in the meantime you may use the wheel free, and
WEAR IT OUT IF YOU CAN, AND RETURN THE HUB FOR PAY.

16 inch x 2 inch ...	$8.00	18 inch x 2 inch....	$11.50
16 inch x 2½ inch..	10.50	18 inch x 2½ inch..	14.50
16 inch x 3 inch....	11 50	18 inch x 3 inch....	17.50

No other sizes at proportionately low prices.
HEATON EMERY WORKS,
BALLSTON SPA, N. Y.

ALBANY, N. Y., March 25, 1881.
GENTS: We have carefully and thoroughly tested the 3 x 16 Hard Times Wheel you sent us, and find pleasure in pronouncing it a first-class Wheel. Yours very truly, PERRY & CO.

ASHLAND EMERY CO.
CHARLES ALDEN, MANAGER.
Importers and Manufacturers of PURE
TURKISH EMERY
A. A. IRVINE & CO., Agents,
14 MURRAY ST., NEW YORK.
Send for quotations and samples.

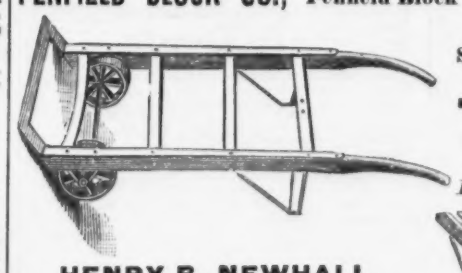
COVERT MFG. CO.,
SOLE MANUFACTURERS OF

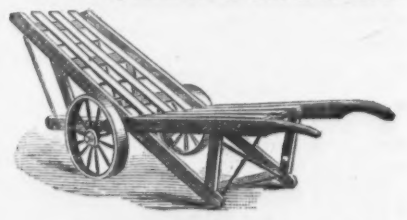
COVERT'S
PATENT HARNESS SNAPS,
Chain and Rope Goods.
These goods are sold by all leading jobbers in General and Saddlery Hardware at manufacturers' prices.
Send for illustrated catalogue and price list.
COVERT MANUFACTURING COMPANY,
WEST TROY, N. Y.

LOGAN & STROBRIDGE,
New Brighton, Pa.,
MANUFACTURERS OF
COFFEE MILLS,
Patent Sunk
HOPPER MILLS.
—
Iron, Britannia, Brass and Plated
HOPPER MILLS.
—
Wood Bock
SIDE MILLS.
Spice Mills.

HAND AND POWER CORN MILLS.
ALSO,
Housefurnishing and Builders' Hardware and Light Castings.
Send for Catalogue and Prices.

PENFIELD BLOCK CO., Successors to Penfield Block Works, **Lockport, N. Y., U. S. A.**
Manufacturers of a Full Line of
Store, Warehouse, Platform, Railroad and Express
TRUCKS.
PULLEY BLOCKS, SHEAVES,
Faucets, Mallets & Car Pushers.





HENRY B. NEWHALL,
105 Chambers Street,
NEW YORK AGENT.
S. H. & E. Y. MOORE,
163 & 165 Lake Street,
CHICAGO AGENT.

REMOVAL.
Please notice that we have removed from **No. 295 THIRD AVENUE** to
No. 37 Warren Street, near Church St.,
Where we hope to be favored with a continuance of your generous patronage.
J. M. FARRINGTON & CO.,
Successors to EAY, FARRINGTON & CO., Manufacturers of
LOCKS, KNOBS, GONGS, BLANK KEYS,
Wrought Store Door and Flush Bolts, Silver Plated, Ornamental Bronze and other Hardware.

PHILADELPHIA SMELTING COMPANY, Limited,
S. E. Cor. Twelfth and Noble Sts., PHILADELPHIA.
GENUINE BABBITT,
Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years
DEOXIDIZED BRONZE,
Superior to Phosphor Bronze or any her alloy of Copper and Tin for Machinery Journals.

PHILADELPHIA, October 4, 1879.
PHILADELPHIA SMELTING COMPANY, City.—GENTLEMEN: After a trial of eighteen months of Your "Deoxidized Bronze" as journal boxes in our rolling mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used.
Very truly, HENRY DISSTON & SONS.

New York Wholesale Prices, May 25, 1881.

HARDWARE.

Anvils.
Eagle Anvils American ... ℘ ℔ 10c dis 20 %
Wright's ... 10½c @ 11c
Armitage's Mouse Hole ... 9½ @ 9¾c
Trenton ... 10½c
Wilkinson's ... 10 c

Anvil, Vise and Drill.
Millers Falls Co., $28.00 ... dis 20 %

Augers and Bits.
Conn. Valley Mfg. Co. | Douglass Mfg. Co. | Humphreysville Mfg. Co. | Ives | Beecher (French, Swift & Co) | Griswold | Nobles Mfg. Co. | Kasson's Patent ... dis 40 % from list of Jan 7. 1880
Cook's, Douglass Mfg. Co. ... dis 40&10 %
Snell Mfg. Co.'s C. S. Augers ... dis 40 %
" " B. Machine ... dis 40 %
" " C. S Bits ... dis 40 %
" " Jenning's Bits ... dis 35 %
Patent Solid Head ... dis 30 %
Lewis' Patent Single Twist ... dis 40 %
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand-Rail Bits ... dis 10&10&10 %
Russell Jennings' Augers ... dis 16⅔&10&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers dis 25&10&10&10 %
Imitation Jenning's Bits ... dis 40@45 %
Ives' "Jennings" Bits ... dis 33⅓&10 %
Andrews Bits ... dis 40 %
Expansive Bits, Clark's, small, $18; l'ge. $26 ... dis 25 %
" " Ives ... $20 @ $30—dis 33⅓ %
" " Blake's ... $20—dis 40 %
" " Parmelee's ... $20 and $30 .dis 33⅓ %
Hollow Augers Ives' | French, Swift & Co ... dis 20 %
" " Douglas ... dis 20 %
" " Bonney's Adjust ... ℘ doz $48—dis 25&10 %
Stearns' Adjust. ℘ doz $48—dis 20&10 %
" Ives' Expansive ... each $4.50—dis 30 %
" " Universal Expansive, each $4.50—dis 20 %
Woods ... dis 25 %
Gimlet Bits ... $7.50 ℘ gross, dis 45 %
" Diamond ... ℘ doz $1.10 dis 20&10 %
" "Bee" ... dis 35&5 %
Double Cut Gimlet Bits, Shepardson's ... dis 40 %
" " Ct. Valley Mfg. Co ... dis 30&10 %
" " Hartwell's ... dis 60&10 %
" " Douglass' ... dis 40 %
" " Ives' ... dis 50 %
Morse's Bit Stock Drill ... dis 25 %
L'Hommedieu's Ship Augers ... dis 15 %
Watrous Ship Augers ... dis 15 %
" Extension Lip ... dis 30 %

Awl Hafts.
Sewing Brass Ferrule ... $3.50 ℘ gross—dis 40&10 %
" " ... 3.50 " dis 40&10 %
Patent Sewing, Short ... $1.00 ℘ doz—dis 40&10 %
" " Long ... $1.40 ℘ doz—dis 10 %
Patent Peg Plain Top ... $10.00 ℘ gross—dis 40&10 %
" " Leather Top ... 12.00 " dis 40&10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common ... ℘ gross $1.70—dis 25&10 %
Shouldered Peg ... ℘ gross 2.45—dis 25&10 %
Patent Peg ... ℘ gross .63—dis 25&10 %
Shouldered Brad ... ℘ gross $2.70—dis 25&10 %
" Handled Brad ... $7.00 ℘ gross—dis 20&10 %
Handled Scratch ... $7.00 ℘ gross—dis 20&10 %
" Socket Scratch ... $1.00@$1.25 ℘ doz—net
Brad Sets, Aiken's ... ℘ doz $17.00—dis 45&10 %
" No. 42, $10.50; No. 43, $12.50 ... dis 70 %
" Stanley's Excelsior, No. 1, $9.60 ... dis 30&10 %
" " " No. 2, 4.80 ... dis 30&10 %
" " " No. 3, 7.80 ... dis 30&10 %

Axes.
Single Bit, 4½ to 5½ and under ... ℘ doz $10.00 net
4½ to 6 and over ... ℘ doz $10.50 net
Beveled ... 50 c ℘ doz advance
Double Bit, 4½ to 5½ and under ... ℘ doz $19.00 net
" 4½ to 6 and over ... ℘ doz $20.00 net
" Beveled ... $1.00 ℘ doz advance

Axle Grease.—Fraser's ... ℘ ℔ 6c

Bag Holders.
Sprengle's Patent, per doz. $18 ... dis 40 %

Balances.
All Spring Balances ... dis 15&10 %

Bells.
Hand, Light Brass ... dis. 65&10 %
" Extra Heavy ... dis 45 %
" White Metal ... dis 60 %
" Silver Chime ... dis 20&10 %
" Globe (Cone's Patent) ... dis 25&10 %
Gong, Abbe's ... dis 20&10 %
" Yankee ... dis 30&10 %
" Barton's ... dis 30&10 %
Crank Taylor's ... dis 25&10 %
" Brook's ... dis 50&10&2 %
" Cone's ... dis 10 %
" Connel's ... dis 35 %
Lever, Sargent's ... dis 60&10 %
" Taylor's Bronze or Plated Lever ... net
" " Japanned Lever ... dis 25&10 %
" R. & E. M. Co.'s ... dis 50&10&2 %
Pull, Brook's ... dis 50&10&2 %
" Western ... dis 25&10 %
Call ... dis 25 %
Cow, Common Wrought ... dis 55 & 10 %
" Western ... dis 20&10 %
" Sargent's new list ... dis 55&10 %
Kentucky "Star" ... dis 20&10 %
" Sargent's new list ... dis 55&10 %
Dodge's Genuine Kentucky, new list—

Nos.	0	1	1½	2	3	4	5	6	Hog	
	$12.00	10.00	9.00	8.00	6.00	5.00	3.50	2.50	5.00	dis 50 %

Texas ... dis 30&10

Bellows.
Blacksmiths', Common ... dis 45 %
Extra and Pittsburgh Pattern ... dis 20 %
Moulders' ... dis 25 %
Hand Bellows ... List of Dec. 1, 1879, net

Belting, Rubber.
N Y Belting and Packing Co ... dis. 20@50 %

Bit Holders.
Extension, Barber's ... ℘ doz $15.00—dis 40&5 %
" Ives' ... ℘ doz $15.00—dis 40 %
Diagonal ... ℘ doz $24.00—dis 40 %
Angular ... ℘ doz $24.00—dis 40&5 %

Blind Adjusters.—Domestic ... ℘ doz $3.00, dis 15 %

Blind Fasteners.
Mackrell's ... per doz. pairs, $1.00. dis 10%
Van Sand's ... No. 2000, per gross, $10.00 ... dis 10 %
" old pattern ... ℘ gross, $9.60 net
Washburn's Patent ... ℘ gross $10.50 net
Merriman's ... new list net
Mackrell's ... ℘ doz. pairs, $0.65, dis. 10 %

Blind Staples.
Barbed, ½ in. and larger ... ℘ ℔ 11c net
" ⅜ in ... ℘ ℔ 13c net

Blocks.
Differential Pulley Blocks ... dis 20 %
Penfield Block Co., Rope and Iron Strap'd ... dis 40 %
" " " Wrot. Iron Com. bushed. dis 25 %
" " " " " all steel roll'r. dis 10 %
" " " Sheaves " " dis 35 %
Stanley R. & L. Co., Rope and Iron Strap'd ... dis 40&10 %

Bolts.
Cast Iron Barrel, Shutter, &c ... dis 55&10 %
Cast Iron Chain (Sargent's list) ... dis 70&10 %
Bush's Lever and Chain Bolts ... dis 40 %
Ives' Pat. Door Bolts ... dis 50 %
Wrought Barrel ... dis 60&10 %
" Square ... dis 60&10 %
" Shutter, all Iron, Stanley's list ... dis 50&10 %
" " Brass Knob. " " ... dis 20&10 %
" " Sargent's list ... dis 60&10 %
" Sunk Flush, Sargent's ... dis 75&10 %
" " Stanley's ... dis 40&7½ %
" B. K. Flush, Com'n. Stanley's ... dis 50&6 %
" " " Ex. Heavy. " ... dis 40&10 %
" Plated Knob & Slide Flush " ... dis 50&2½ %
Carriage and Tire, Common ... dis 80&5 %
" " Philadelphia, new list ... dis 65 %
" " Philada. Pattern ... dis 70 %
" " Shelton's ... (old list) dis 60&10 %
R. B. & W. Carriage (old list) ... dis 65 %
Tire, Am. Screw Co.'s, Phila, new list, Nov 1, '79. dis 75 %
" "Bay State" ... dis 80&10 %
" R. B. & W., new list ... dis 70&10 %
Stove—American Screw Co.'s ... dis 40 %
" R. B. & W ... dis 40 %
Plow ... dis 45 %
" R. B. & W ... dis 40 %
Machine ... dis 65 %
Bolt Ends ... dis 65 %

Borax ... 17c ℘ ℔ net

Boring Machines.

	Upright.	Angular.	
First quality, no Augers	$5.50	$6.75	dis 40 %
Phillips' with Augers	6.50	7.00	net

Boxes.
Interchangeable Shelf Boxes ... dis 20 %

Braces.
Q. S. Backus ... dis 50 %
Wilson Mfg. Co ... dis 10 %
Barber's ... dis 40&5 %
Spofford's Patent ... dis 50&5 %
Nottle's Patent ... dis 40&5 %
Ives' Patent Braces ... dis 50&10 %
Common Ball (American) ... dis 50&5 %
Amidon's ... dis 50 %
Barker's Impd ... dis 40 %
Empire ... dis 30 %
Buffalo Ball ... dis 40 %

Brackets.—Shelf (Sargent's) ... dis 60&10 %
Reading ... dis 60&10 %

Bright Wire Goods list of Dec. 15, 1879. dis 60&10 %

Bull Rings.—Union Nut Co ... dis 50&20 %
Sargent's ... dis 66⅔&10 %
Hotchkiss' ... low list dis 35 %
Humason, Beckley & Co.'s ... dis 60&10 %

Butts.
Wrought Brass ... dis 75&5 %
Cast Brass, Tiebout's ... dis 30 %
" Corbin's ... dis 20&10 %
Fast Joint, Narrow ... dis 45&10 %
" Broad ... dis 45&10 %
Loose Joint ... dis 55&10 %
" Japanned ... dis 55&10 %
" with Acorns ... dis 45&10 %
" Japanned, with acorns ... dis 55&10 %
Parliament Butts ... dis 60&10 %
Mayer's Hinges ... dis 60&10 %
Loose Pin, no Acorn ... dis 55&10 %
" Acorns ... dis 55&10 %
" " Japanned ... dis 60&10 %
" " " Plated Tips ... dis 60&10 %

WROUGHT IRON.

Fast Joint Narrow ... dis 50&10 %
" Lt. Narrow ... dis 50&10 %
" Broad ... dis 50&10 %
Loose Joint, Broad ... dis 55&10 %
Table Butts, Back Flaps, &c ... dis 50&10 %
Inside Blind, Regular ... dis 50&10 %
" " Light ... dis 50&10 %
Loose Pin, Wrt ... dis 55&10 %
" " " Light ... dis 50&10 %

Spring Hinges:
American Spiral Spring Butt Co., Jap'd ... dis 25 %
" " " " Fancy ... dis 20 %
Gem Spiral Spring Butts, Japanned ... dis 25 %
" " " " Ornamental ... dis 20 %
Geer's Spring and Blank Butts ... dis 25 %
Sabin Mfg. Co.'s Double Acting ... dis 35 %
Union Spiral Spring, Japanned ... dis 25 %
" Ornamental ... dis 20 %
Union Spring Hinge Co.'s ... dis 25 %
American Spring Hinge Co.'s ... dis 25 %
Union Mfg. Co ... dis 25 %
Bommer's ... dis 25 %
Buckman's ... dis 25 %
Blind Butts, Parker ... dis 75 %
" Palmer ... dis 45&10 %
" Seymour ... dis 66⅔&10 %
" Shepard's "Double Locking" Nos. 1 & 2 ... dis 60&10&10 %
Shepard's "Noiseless," Nos. 50 & 60 ... dis 60&10&10 %
" Lull & Porter ... dis 66⅔&10 %
" Nicholson ... dis 45&10 %
" Huffer ... dis 50 %
" Clark's, Nos. 1, 3, 5 ... dis 75 %
" Sargent's No. 12 ... dis 75&10&10 %

Bow Pins.
Hotchkiss' ... low list net
Humason, Beckley & Co.'s ... dis 65 %
Sargent & Co.'s ... $19.70 and $21.30, dis 60&10 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co ... dis 20 %
Bradley's ... dis 25 %
Beatty's ... dis 25&5 %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

Can Openers.
Messenger's Comet ... ℘ doz $5.00. dis 25 %
American ... ℘ gross $7.50. dis 10 %
Duplex ... ℘ doz 25c. dis 15@20 %
Lyman's ... ℘ doz $3.75. dis 20 %
No 4, French ... ℘ doz $2.25, dis 55 %
No. 5, Iron Handle ... ℘ gross $7.50 dis 10 %
Eureka ... ℘ doz $2.50, dis 10 %
Sardine Scissors ... ℘ doz $7.00, dis 55 %
Star ... ℘ doz $5.00, dis 20@25 %
Sprague ... dis 50@10 %
"Worlds Best" per gross, No. 1, $12; No. 2, $24; No. 3, $36 ... dis 50 %

Caps—Percussion, ℘ 1000.
U. M. C., F. C. trimmed ... 50c | F. L. ground ... 70c } dis 10&5 %
U. M. C. Cen. fire ground ... 70c | " Double W. proof ... $1.40 } dis 10&5 %
G. D. & S. B ... 36c, dis 7½ %
Double Waterproof, in 1 10's ... $1.40 | Colt's Pistol, " ... 70c } dis 10&5 %
F. L ... 50c | E. B. 1-10, Trimmed ... 65c | E. B. 1-10 Ground Edge ... 70c } dis 10&5 %
Musket, in 1-10's ... 75c net

Cartridges.—Rim ... dis 60&10&10 %
Central Fire ... dis 20 %

Cards.—Horse and Curry ... dis 10 %
Cotton ... dis 10 %
Wool ... dis 10 %

Carpet Stretchers.
Cast Steel, Polished ... ℘ doz $5.00, dis 30 %
" Iron Steel Points ... ℘ doz $2.00, dis 45 %
Bullard's ... dis 25 %

Casters.
Bed ... new list July, '80, dis 35&10 %
Plate and Shallow Socket " " dis 35&10 %
Deep Socket " " dis 25&10 %

Cattle Leaders.
Humason, Beckley & Co.'s ... dis 65&10 %
Sargent's ... dis 66⅔&10 %

Chain.
Trace, 6½-1-2 ... ℘ pair 79c | " 6½-10-3 ... ℘ pair 70c | " 7-10-2 ... ℘ pair 86c } dis 40 %
German Halter Chain, New list Oct. 22, '79 ... dis 50 %
" Coil, New list Oct. 22, '79 ... dis 50 %
Covert Halter, Hitching and Breast ... dis 35 %
Oneida Halter Chain (old list) ... dis 40 %
Galvanized Pump Chain ... ℘ ℔ 100 net
Jack Chain, Iron ... dis 50 %
" Brass ... dis 40 %

Chalk.
White ... ℘ gross 60c net
Red ... ℘ gross 80c net
Blue ... ℘ gross 100c net
White Crayons ... ℘ gross 19c net

Chisels.
Socket Framing, Crossman ... dis 65&5 %
" " Arlington Edge Tool Co ... dis 65&10 %
" " Buck Bros ... new list, dis 22½ %
" " Merrill ... dis 65&10 %
" " Witherby Tool Co ... dis 65&10 %
" " Douglass' ... dis 65&10 %
" Firmers, Crossman ... dis 65&5 %
" " Arlington Edge Tool Co ... dis 65&10 %
" " Buck Bros ... new list, dis 22½ %
" " Merrill ... dis 65&10 %
" " Witherby Tool Co ... dis 65&10 %
" " Douglass' ... dis 65&10 %
" Corner ... dis 65&10 %
Tanged Firmers extra ... dis 33⅓ @ 40 %
" " Butcher's ... $5.00 @ 5.25 to £
" " Spear & Jackson's ... 5.00 to £
" " Buck Bros. (Shank) ... 5.25 to £

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron ... dis 25 %
" Adjustable, Gray's ... dis 20 %
" " Lambert's ... dis 20 %
" " Snow's ... dis 40&5 %
" " Hammer's ... dis 15 %
" " Stearns' ... dis 15&10 %
" Cabinet, Sargent's ... dis 70&10 %
" Carriage Makers', Sargent's ... dis 65&10 %
" Cord and Tape (T. & S. Mfg. Co.) ... dis 30 %

Clips, Axle.
Norway or Best ... dis 40&5 %
Superior ... dis 65&5 %

Coal Hods.
Griffiths ... dis 33⅓ %

Cockeyes ... dis 35&10 %

Cocks, Brass.
Racking ... new list, July 10, '80 | Globe " " | Plain Bibbs " " | Ale and Beer " " } ... dis 40 %

Coffee Mills.
Board and Box ... dis 45 %
Wilson's ... dis 35&10&5 %
Selsor's Pat ... $9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) ... dis 25 %
French Steel ... dis 25 %

Combined Dinner Pail and Lantern.
Per doz $15.00 ... dis 30 %

Compasses, Dividers, &c.
Compasses ... dis 55 %
Callipers ... dis 55 %
Dividers ... dis 55 %
Bemis & Call Co.'s Dividers ... dis 60&5 %
" " Compasses & Callipers ... dis 50&5 %
" " Wing & Inside or Outside. dis 50&5 %
" " Double ... dis 60 %
" " Call's Pat. Inside ... dis 30 %
Cook's ... dis 25 %
Excelsior ... dis 50 %
Miller's Patent ... dis 25 %

Coopers' Tools.
Bradley's ... dis 15 @ 20 %

Corkscrews.—Humason & B ... dis 33⅓ %
Clough's Wire ... dis 25 %

Corn Knives and Cutters.—Bradley's .. dis 10 %
Wadsworth's ... dis 33⅓ %

Crow Bars.
Cast Steel ... ℘ ℔ 8¼c
Iron, Steel Points ... ℘ ℔ 6¼c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1.80 2.00, 2.40 ... dis 10 %
Curling Tongs ... ℘ doz $3.65, dis 10 %
Pinching Irons ... ℘ doz 7.50, dis 20 %

Curry Combs.
Fitch's new list ... dis 45 @ 50 %
Hotchkiss' Novelty ... new list, July, 1880, dis 25 %
" Exclr. Supr. Champion ... dis 25 %
Lawrence ... new list, July 1880 dis 25 %
Lawrence, with detachable Mane Comb new list July 1880, dis 25 %
Rubber ... ℘ doz $10.00, dis 15 %

Curtain Pins.—Silvered Glass ... net
White Enamel ... net

Cutlery.
Meriden Cutlery Co. (Table) ... net
Am. Miller Bro.'s Cutlery Co ... dis 25 %
Humason & Beckley, Pocket ... dis 33⅓ %
The Wm. Rogers Mfg. Co ... net
Naugatuck Cutlery Co ... list net
Aaron Burkinshaw's Pocket ... dis 25 %

Dog Collars.
Embossed Gilt ... dis 20 %
Leather ... dis 40 %
Brass ... dis 40 %
Celluloid ... dis 40 %

Door Springs.
Torrey's Rod ... ℘ doz $2.10, dis 10 %
Gray's " ... ℘ doz $1.70. net
Bee Rod ... ℘ doz $1.70. net
Warner's ... dis 15&10 %
Gem (Coil)—
No. 1, Large, Japanned ... ℘ doz $3.50 | No. 2, Medium, " ... ℘ doz 2.50 | No. 3, Small ... ℘ doz 2.00 } dis 25&10 %
Star (Coil)—For Cop'd, Nickel-Plated, &c. see list.
No. 4, ("Snoo Fly") Screen door size ℘ doz $1.80 | No. 5, Screen Door Size ... ℘ doz $2.00 | No. 6, Medium ... ℘ doz 2.50 | No. 7, Large ... ℘ doz 3.50 } dis 30&10 %
Sabin's Lever. No. 1, $1; 2, $1.50; 3, $2; 4, $2.50; dis 30 %
Sabin's Boss ... No. 1, $5.40; 2, $4.20; 3, $3.00. dis 50 %
Sabin's Crown ... ℘ doz $2.75, dis 50 %
Philadelphia ... 5 in., $5.00; 8 in., $7.00, dis 35 %
Barker's Concealed ... dis 20 %
Cowell's ... No. 1, $18.00; No. 2, $15.00 ℘ doz, dis 50 %
Rubber, complete ... ℘ doz $1.80, dis 10 %
Hercules ... dis 40 %

Drawing Knives.
Arlington Edge Tool Co ... dis 65&10 %
Crossman's No. 1 ... dis 65&5 %
Merrill ... dis 65&10 %
Nobles Mfg. Co ... dis 15 %
Bradley's ... dis 35 %
Adjustable Handle ... dis 20 %
Witherby Tool Co ... dis 65&10 %
Douglass ... dis 65&10 %

Drills and Drill Stocks.
Blacksmiths' ... each $2 70 net
Blacksmiths Self Feeding ... each $7.50, dis 20 %
Breast P. S & W ... dis 20&10 %
" Hotchkiss ... dis 20 %
Breast, Wilson's ... dis 20 %
" Miller's Falls ... each $3.00. dis 25 %
" Bartholomew's ... each, $2.50 dis 25&10 %
Ratchet, Merrill's ... dis 10 %
" Ingersoll's ... dis 25 %
" Whitney's ... dis 20 %
" Weston's ... dis 20 %
" Moore's Triple Action ... dis 20 @ 25 %
Whitney's Hand Drill ... dis 50 %
Wilson's Drill Stocks ... dis 10 %
Automatic Boring Tools ... each $2.25, dis 20 %

Drill Chucks.—Morse's Beach Patent ... dis 30 %
" Adjust. each $10.00, dis 30 %
Danbury ... $8.00, dis 30 %

Egg Beaters.
Dover ... ℘ doz. $2.50 dis 2 %
Acme ... $20 per gross, dis 33⅓&10 %
Standard ... $24 per gross, dis 33⅓ %
National ... ℘ doz $4.50, dis 33⅓ %
Family ... per gross $15; per doz., $1.40 net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved) ℘ 100 $15.00 @ $54.00, dis. 10 %
Mill E. Buckets, heavy, 5 to 10 inches (Duc's improved) ℘ doz $5.60 @ $10.20 dis. 10 %
Storehouse, Duc's Pat.) 12 to 17, $12.00 @ $20.00. dis. 10 %

Emery and Emery Paper.
Regular numbers ... ℘ ℔ 4c
Flour and F F ... ℘ ℔ 5c
B. & A. Emery Paper ... dis 25&3 %
Sibley's Emery and Crocus Cloth. Large size, $16; Medium, $10.50 per ream; dis 15 %

Enameled and Tinned Ware.
Kettles ... 45 %
Sauce Pans ... dis 30 %
Tinned Sauce Pans ... dis 30 %

Escutcheon Pins.
Iron ... dis 20 %
Brass ... dis 15 %

Escutcheons.
Door Lock ... Same discounts as Door Locks
Brass Thread ... dis 55 %
Wood ... dis 25 %

Faucets.
Fenn's ... dis 40 %
Fenn's Cork Stops ... dis 33⅓ %
Star ... dis 55&10 %
Frary's Patent Petroleum ... dis 20&10 %
Wood and Metallic ... dis 40 %
West's Patent Key ... dis 45 %
Metallic Key, Leather Lined ... dis 50 %
Cork Lined ... dis 70 %
Enterprise (Self Measuring) ... ℘ doz, $36.00, dis 25 %

Felloe Plates ... ℘ ℔ 10c, dis 20 %

Files.
Auburn ... $5.00 to £, dis 35 %
E. M. Boynton's ... new list, dis 25 %
J. & Riley Carr ... 4.50 to £
Johnson & Bro ... dis 30 %
Butcher's ... 4.50 to £
Walter Spencer & Co.'s "Diamond" ... 4.50 to £
Fisher's ... 4.75 to £
Moss & Gamble ... 4.50 to £
H. Disston & Sons (new list) ... dis 40 %
Heller Bros.' Horse Rasps ... dis 20@25 %
Nicholson ... dis 30&10 %
New American ... dis 40 %
Union File Co ... dis 40 %

Fluting Machines.
Knox, 4-inch Rolls ... $3.25 each | " 6 " ... 4.00 " | " 8 " ... 6.50 " } dis 20 %
Peerless, 4-inch Rolls ... 4.00 each net
" 5 " ... 4.75 each net
Eagle, 3½-inch Roll ... $2.15, dis 20 %
" 5½ " ... $2.85, dis 20 %
Eureka, No. 1, 7-inch Roll ... 6.00 each, dis 10 %
" No. 2 5-inch Roll ... 4.00 each, dis 10 %
Crown .. 4½-in. $3.50; 6-in. $4.00; 8-in. $6.50 each dis 20 %
Star ... 4½ in., $4.00; 6 in., $5.00 each dis 20 %
Crown Jewel ... 6 in., $3.40 each. dis 20 %
American, 5 in., $3; 6 in., $3.40; 7 in., $4.50 each dis 20 %
Domestic Fluter ... 1.50 each net
Geneva Hand Fluter, White Metal .. ℘ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15.00; 2, $12.60; 3, $10.00 ℘ doz ... dis 25 %
Shepard Hand Fluter ... No. 75 ℘ doz $15, dis 10 %
" " " No. 90, $9.00; No. 110, $7.25;
" " " No. 100, $6.00 ℘ doz ... net
Clark's Hand Fluter ... ℘ doz $15.00, dis 33⅓ %
Combined Fluter and Sad Iron ... ℘ doz 15.00, dis 30 %
Buffalo ... ℘ doz 10.00, dis 10 %

Fluting Scissors ... dis 45 %

Fly Traps.
Paragon ... per doz, $3; net

Forks.
Hay, Manure and Spading ... dis 50 %
Plated "A 1, Rogers & Bro ... dis 40&5&5 %
" Reed & Barton ... dis 40&5&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co ... dis 25 %
American ... dis 20 %

Fry Pans.
Burnished, list as follows ... dis 65 %

No.	0	1	2	3	4	5	6	7	8
℘ doz.	$3.00	$3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

"Acme" ... dis 45 %

Gauges.
Marking, Stanley's ... dis 40&10 %
" Chapin's ... dis 50&10 %
Wire ... dis 10&10 %
" Disston's ... dis 20 %

Gimlets.
Nail and Spike ... dis 45 %
"Bee" Gimlets ... ℘ gross $12. 0 dis
"Eureka Gimlets ... dis 50 %
"Diamond Gimlets ... dis 40 %
Double Cut, Shepardson's ... dis 40 %
" " Hartwell's ... dis 50 %
" " Ives' ... dis 50 %
" " Douglass' ... dis 40%

Glue Pots.
Tinned and Enameled ... dis 25 %
Family, Howe's "Eureka" ... dis 40 %
" L. F. & C.'s "Handy ... dis 25 %

Grindstone Fixtures.
Sargent's Patent ... dis 70&10&10 %
Reading Hardware Co., new list ... dis 30&10 %

Gun Wads.
U. M. C. B. E. 11 up ... $2.00 | " " 9 & 10 ... 2.30 | " " 7 & 8 ... 2.60 | " P. E. 11 up ... 3.10 | " " 9 & 11 ... 4.00 | " " 7 & ... 4.90 } dis 5&5 %

Halters.
Covert's Pat. Rope ... dis 50%
Horse and Cattle Ties, Covert's ... dis 50%

Hammers.
Maydole's ... dis 15 %
Cheney's ... dis 25 %
Hartford Hammer Co. (new list July 20, '80) ... dis 20 %
Humason & Beckley ... dis 50 %
Verree ... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 and 1.75. dis 25&10 %
Warner & Noble's ... dis 10 %
Kip's ... dis 20 %
Yerkes & Plumb ... dis 15 %
Wilkinson's Smiths' ... 11½c ℘ ℔ net

Hand Cuffs and Leg Irons.
Providence Tool Co. Hand Cuffs, $15.00 ℘ doz | " " Leg Irons, $25 ℘ doz } dis 10 %
Tower's ... dis 25 %

Handles.—Door or Thumb Latches—

Nos.	0	1	2	3	4	
Per doz.	$0.80	1.00	1.18	1.35	1.50	dis 60&10 %

Roggin's Latches ... per doz 50c@40c net
Bronzed Iron Drop Latches .. ℘ doz $0.75 @ 0.85 dis 10 %
Jap'd Store Door Handles—Nuts, $1.62; Plate $1.08
no Plate, $0.87 ... dis 10 %
Barn Door ... per doz $1.10, dis 10 %
Wrought Chest ... dis 65&10 %
Surface Chest ... dis 55&5&10 %
Flush Chest ... dis 60&10&10 %
Lifting ... dis 60&10 %
Saw and Plane ... dis 40&10 %
Boynton's Pat. Loop Saw Handles ... dis 25 %
" " Centennial Saw Handles ... dis 25 %
Hammer and Hatchet ... dis 20 %
Brad Awl ... ℘ gross $2.00. dis 20&10 %
Hickory Firmer Chisel, assorted, ℘ gross $4.50 | " " " large, " 5.00 | Apple " " assorted, " 5.00 | " " " large, " 6.00 | Socket " " assorted, " 3.00 | " Framing " assorted, " 5.00 | File, assorted, ℘ gross ... 2.75 | Auger, assorted, ℘ gross ... 6.00 | " large, " ... 7.00 } dis 20&10
Patent Auger, Ives' ... dis 25
" Douglass' ... ℘ set $1.25, net
" Swan's ... ℘ set $1, net

Hangers.
Barn Door, old patterns ... dis 55&10 %
" New England ... dis 65&10 %
Novelty ... dis 40 %
Challenge ... dis 50 %
Climax (Anti-Friction) ... dis 50 %
Sterling Improved (Anti-Friction) ... dis 60&10 %
Cheritree ... dis 50 %
Kidder's ... dis 50&10 %
U. S ... 4 in., $12; 5 in., $15; dis 50 %
The "Boss" ... dis. 40&10 %

Harness Snaps.
Henshaw's ... List of 1¼ changed to 14.00, dis 55 @ 60 %
Judd's ... " " " 14.00, dis 55 @ 60 %
Fitch's (Bristol) " " 14.00, dis 55 @ 60 %
Hotchkiss' ... dis 10 %
Andrews' ... dis 50 %
Sargent's ... dis 65&10 %
"German ... dis 75 %
Covert ... dis 40 %
Covered Spring ... dis 45&10 %

Hatchets.
Isaiah Blood ... dis 51

	Nos. 1 2 3				
Shingling,	Nos. 1 2 3	℘ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	℘ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	℘ doz	7.50	8.00	8.50

Hunt's ... dis 25 %

Shingling,	Nos. 1 2 3	℘ doz	$7.25	$8.00	$8.75
Claw,	Nos. 1 2 3	℘ doz	7.75	8.50	9.25
Lathing,	Nos. 1 2 3	℘ doz	7.50	8.25	9.00

Hurd's ... dis 35 @ 40 %

Shingling,	Nos. 1 2 3	℘ doz	$8.00	$8.50	$9.00
Claw,	Nos. 1 2 3	℘ doz	9.00	9.50	10.00
Lathing,	Nos. 1 2 3	℘ doz	8.00	.50	9.00

Yerkes & Plumb ... dis 40

Shingling,	Nos. 1 2 3	℘ doz	$7.50	$8.00	$8.50
Claw,	Nos. 1 2 3	℘ doz	8.25	8.75	9.25
Lathing	Nos.	℘ doz	7.50	8.00	8.50

Simmon's ... dis 20

Shingling,	Nos. 0 1 2 3	℘ doz	$7.50	$8.00	$8.50	$9.00
Claw,	Nos. 1 2 3	℘ doz		9.00	9.50	10.00
Lathing,	Nos. 1 2 3	℘ doz		8.00	8.50	9.00
Broad,	Nos. 1 2 3 4	℘ doz	9.00	10.00	12.00	14.00
"	Nos. 5 6 7 8	℘ doz	16.00	18.00	20.00	22.00

Collins ... dis 10

Shingling,	Nos. 1 2 3	℘ doz	$6.00	$6.50	$7.00
Claw	Nos. 1 2 3	℘ doz	6.50	7.00	7.50
Lathing,	Nos. 1 2 3	℘ doz	6.00	6.50	7.00

Hay Knives.
"Lightning" ... ℘ doz $20.00 net
Wadsworth's ... dis 33⅓ %

Hinges.
Gate, Western ... ℘ doz $6.25, dis 60&10 %
" N. E ... ℘ doz $10.12, dis 65 %
" N. E. Reversible ... ℘ doz $6.50, dis 60 %
Gate, Clark's No. 1 ... ℘ doz $0.00, dis 60 %
" N. Y. State ... ℘ doz $0.50, dis 65 %
" Automatic ... ℘ doz $12.50 dis 40 %
" Common Sense ... dis 20&10 %
" Seymour's ... dis 50&10 %
" Shepard's ... Nos. 10, 20 & 25, dis 60 %
Rolled Blind Hinges ... dis 60&10&10 %
Rolled Plate ... dis 6 &10&10 %
Rolled Raised ... dis 60&10&10 %
Plate Hinges | 8, 10 & 12 in. $5.55 ℘ 100 ℔ | "Providence" | over 12 in. $4.25 ℘ 100 ℔ } ... dis 10 %
Screw Hook and Strap | 8, 10, 12 in., $5.75 ℘ 100 ℔ | 14 to 36 in., $4.25 ℘ 100 ℔ } dis 10 %
Heavy Welded Hook | 8 to 12 in., $5.55 ℘ 100 ℔ | 14 in. & up, 4.25 ℘ 100 ℔ } dis 10 %
Screw Hook and Eye ... | ⅝ & 1 in., 9c | ¾ in. 9c | ⅝ in. 10c | ½ in. 12c } dis 20 %
Wrought Strap and T. list Dec. 20, '77 ... dis 50&10&10 %

Hoes.—Riveted Shank ... per doz, $5.00; dis 35 %
Socket ... ℘ doz $5.25, dis 35 %
Grub ... dis 15 %
Planters' ... dis 35 %
Scovill Pattern ... dis 20&10 %
Scovill Pattern, Handled ... dis 25 %
Hick's Pat. Solid C. S. Planters' ... dis 20&10 @ 30 %
" " " Scovill Pattern dis 20&5 @ 35 %
Winsted & Lane, Planters ... dis 25 %
" " Scovill Pattern ... dis 20@25 %
Magic ... per doz, $5; net

Hooks.
Bird Cage, Sargent's list ... dis 60&10 %
" Reading ... dis 40&10 %
Cotton ... per doz. $4, dis 50 %
Cotton, Patented (N. Y. Mallet & Handle Wks), dis 30 %
Cotton (Humason & Beckley Mfg. Co.) ... dis 40 %
Belt ... dis 60&10 %
Bench—Hotchkiss', $5.00 ℘ doz ... dis 10 %
" Weston's, No. 1, $10.00; No. 2, $9.00 ℘ doz dis 25 %
" McGill's, $3.00 ℘ doz ... dis 10 %
" Skinner's, $6.25 per doz ... dis 20 %
Clothes Line Sargent's list ... dis 66⅔&10 %
" " Reading list ... dis 40&10 %
Ceiling .. } Sargent's list ... dis 60&10 %
Harness. } Reading list ... dis 40&10 %
Coat and Hat, Sargent's list ... dis 60&10&10 %
" " Reading ... dis 40&10&10 %
Picture Hooks, Brown's Pat. Solid Brass, $4 per gross ... dis 25 %
Tassel (T. & S. Mfg. Co.) ... dis 40 %
Wrought Staples and Hooks and Staples ... dis 75&10 %
" Staples, Stanley's list ... dis 65&10 %
Wire Screw Hooks and Eyes ... dis 65&10 %
Grass and Bush ... dis 40@45 %
Whiffletree—Patent ... dis 40 %
Hooks and Eyes—Malleable Iron ... dis 65&10 %
" " Brass ... dis 65&10 %

Horse Nails

	Nos. 5	6	7	8	9	10	
Ausable, ℘ ℔	31c	28c	26c	25c	24c	23c	dis 30 %
Clinton, "		23c	21c	20c	19c	18c	dis 20 %
Essex, "	31c	28c	26c	25c	24c	23c	dis 30 %
Putnam, "	31c	28c	26c	25c	24c	23c	dis 10&10 %
National, "	25c	23c	21c	20c	19c	18c	dis 20&10 %
Vulcan, "	26c	25c	23c	22c	21c	20c	dis 10 %
Globe, "	28c	26c	23c	22c	21c	20c	dis 10 %
A. C., "	27c	25c	23c	22c	21c	21c	dis 20 %
Ch'mpl'in Forged "	28c	25c	23c	22c	21c	20c	dis 10 %

Horse Shoes.—Burden ... ℘ keg $4.37
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy ... ℘ keg 4.37½
Mule Shoes ... ℘ keg 5.37½

Ice Awls, Chisels, &c.
American Ice Chisel ... ℘ doz. $3.50 net
National " ... ℘ doz $5.25 dis 20 %
Novelty Ice Breakers ... ℘ doz $6.25 dis 20 %
White's Sliding Head Picks ... ℘ doz $2.50 dis 40 %
Dunlap's Ring Picks ... ℘ doz $3.00, dis 40&10 %
Wood Head Picks, Sargent's ... ℘ doz $1.60, dis 40&10 %
Iron " ... ℘ doz 1.25, dis 40&10 %
Ice Mallets Pick in Head ... ℘ doz 1.75 net
" Pick in Handle ... ℘ doz 2.00 net
Ice Axes, Small, Cast or Malleable .. ℘ doz 1.20 dis 10 %
Kitchen Ice Tongs ... ℘ doz 2.25 net
Combination Ice Tools ... ℘ doz $200 net

Kettles.
Brass, 7 to 13 inches inclusive ... ℘ ℔ 32c net
Brass larger than 13 inches ... ℘ ℔ 35c net
Enameled ... dis 45 %

Knives.
Ames' Butcher Knives ... dis 20 %
" Shoe " ... dis 15 %
" Bread " ... ℘ doz $1.50, dis 15 %
Moran's Shoe and Bread Knives ... dis 20 %
Hay and Straw—Wadsworth's" ... dis 33⅓ %
Table and Pocket ... See Cutlery

Knobs.
Carriage (Jap'd 80c. ℘ gross) ... dis 60 &10%
Base—Common ... dis 30&10%
Hemacite Door Knobs ... New list, dis 35&5 %
Door, Mineral | " Por Jap'd | " " Plated | " " Por } Same discounts as Door Locks.
Furniture, Plain ... 79c gross inch, dis 10 %
" Wood Screws ... dis 20 %
Picture (T. & S. Mfg. Co.) ... dis 50&10%
" Sargent's ... dis 60&10 %
Hemacite Picture ... dis 35 %
Shutter, Porcelain ... dis 50&10 %

Ladles.
Melting—Sargent's ... dis 50&10 %
" Reading ... dis 30&10 %
" Monroe's Patent ... ℘ doz $4.00, dis 40 %
" P. S. & W ... dis 30&10 %

Lanterns.
Tubular ... No. 0, $8.65; No. 1, $10.15 | With Guards 35c extra. } net
Nail City ... No. 1, per doz., $10; No. 2, $9, net
Meteor ... No. 1, per doz., $9.50; No. 2, $8.50, net
Hurricane No. 2 ... ℘ doz $5.75 net

Peerless ... No. 5. ℘ doz $11.75, dis 10&10 %
Brady's Patent ... dis 10&10 %
Ætna ... dis 10&20 %
Yankee ... dis 10&10 %
De Beque ... dis 10&10 %
Police .. Small, $6 25; Med., $7.50; Large, $12.00, dis 10 %
Convex Reflector ... $2.75 ℘ doz, dis 10 %

Lawn Mowers.
Pennsylvania, Philadelphia and Excelsior. new list ... dis 30 %

Lemon Squeezers.
Porcelain Lined ... ℘ doz $6.00—dis 30 %
Wood ... ℘ doz $3.00—dis 30 %
Eureka, Tinned ... ℘ doz $8.00—dis 10 %
Dunlap's Improved ... ℘ doz $4.00 net
Sammis' ... No. 1, $7.00; No. 2, $12.00 ℘ doz; dis 45 %
Townsend's Patent ... $6.00 ℘ doz., dis 33⅓ %

Lines.—Linen Fish ... dis 25&10 %
Cotton Chalk ... dis 55 %
Sil. Lake Chalk ... Nos. 0, 1, 2, 3, $6.00, $6.50, $7.00, $7.50 ... dis 25 %
Mason's Linen ... dis 25&10 %
Wire Clothes, Galvanized ... each 25 @ 40c net

Locks and Latches.
Cabinet—Eagle | " Gaylord | " Bridgeport } Changes made in list price of some numbers Jan. 1, 1881, dis 25&2 %
" A. E. Deitz ... dis 30@40 %
Trunk, new list, Jan. 1, 1881 ... dis 20&2 %
Langstroth & Crane's List Jan. 1 '77.
Round Key, No. 1 to 5 ... dis 40&10 %
" No. 5½ to 12 ... dis 40&10 %
Flat Key ... dis 33⅓&10 %
A. E. Deitz, Flat Key ... dis 30 %
Yale Lock Co., Flat Key ... dis 40 %
"Shepardson" or "U. S." ... dis 35 %
"Fetter" or "American" ... dis 33⅓ %
Plate ... dis 33⅓&2 %
F. Many's "Extension Cylinder" ... $10.50 ℘ doz, net

DOOR LOCKS, &C
Branford | Norwalk | Norwich | P. & F. Corbin | Russell & Erwin | Mallory, Wheeler & Co. | Reading Hardware Co. | Trenton Lock Co. } List of June 10, with changes of Dec. 1, 1880, and April 19, 1881, dis 45&2 %
Padlocks—Russell & Erwin | " Mallory, Wheeler & Co. | " Wm. Wilcox & Co. } ... dis 40 % and 2 % for ca h
" Yale Lock Mfg. Co.'s "Standard" ... dis 40 %
" Romer's ... dis 30 %
" Conestoga ... dis 60 %
" J. H. McWilliams ... dis 10 %
" A. E. Dietz ... dis t %

Lustro.—4-oz. bottles, per doz, $2; per gro, $18; net

Mallets.—Hickory ... dis 10&10 %
" Lignumvitæ ... dis 10 %
Penfield Block Co., Lig., Apple & Hickory ... dis 36 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 3 4 ℘ doz .. $14.00 17.00 19.00 30.00—dis 35
Miles' Challenge ... Nos. 1 2 3 ℘ doz .. $22.00 30.00 40.00—dis 35
Perry's Nos. 1 2 3 4 4 g'rd 5 g'rd Each ... $3.00 4.00 5.00 11.00 13.00 36.00—dis 30
Woodruff's (P. S. & W.) ... Nos. 100 150 ℘ doz $15.00 18.00 dis
Hales' ... Nos. 11 12 13 ℘ doz .. $27.00 33.00 45.00 .. dis 40&10 %
Draw Cut ... Nos 5 2 6 8 10 Each .. $50.00 75.00 80.00 225.00 400.00—dis 20 %
American ... dis 25 %
Nos ... 1 2 3 4 B 5 Each ... $5.00 7.00 10.00 25.00 50.00 60.00
Kieser's No. 55 ... $40 per doz., dis 40
" Gem ... $25 per doz., dis 40
Silver & Deming ... dis 25
Pennsylvania ... dis 40&10 %
Nos ... 1 2 3 00 ℘ doz ... $24.00 28.00 36.00 28.00
Beef Shavers (Enterprise Mfg. Co.) ... dis 25 %

Mincing Knives.
Am., (2d quality) per gross, 1 blade, $7; 2 blades, $12; 3 blades, $18 ... net
Lathrop's ... dis 15&10 %
Smith's .. per doz, Single, $1.35; Double, $1.80; dis 10 %
Cowles Hdw. Co ... dis 40&10 %

Molasses Gates.
Stebbins Pattern ... dis 80
" Genuine ... dis 75&10&5 %
" Tinned Ends ... dis 40&10 %
Chase's Hard Metal ... dis 50&10 %
Bush's ... dis 20 %
Lincoln's Pattern ... dis 50&10 %
Weed's ... dis 15 %
Boss, No. 1 2 3 4 $7.00 $8.00 $9.00 $10.00 per doz.
" Japanned Finish ... dis 60&10 %
" Bronze " ... dis 50&10 %

Nails ... See Trade Report

Nuts and Washers.
Square Nuts ... 6c off list
Hexagon Nuts ... 8c off list
Washers ... 7½c off list

Nut Crackers
Table (Humason & Beckley Mfg. Co.) ... dis 33⅓ %
Blake's Pattern ... ℘ doz $2.50, dis 10 %
Turner & Seymour Mfg. Co ... dis 50 %

Oakum.
Best ... ℘ ℔ 11c
U. S. Navy ... ℘ ℔ 10c
Navy ... ℘ ℔ 8½c

Oilers.—Zinc and Tin ... dis 50 %
Brass and Copper ... dis 40 %
Malleable (Hammer's) ... ℘ doz $5.00, dis 10 %
Prior's Patent or "Paragon Zinc ... dis 50 %
" Brass ... dis 40 %
Olmstead's, Tin and Zinc ... dis 50 %
" Brass and Copper ... dis 40 %
Broughton's, Zinc ... dis 40 %
" Brass ... dis 30 %

Ox Balls ... dis 40&10 %

Pencils.
Faber's Carpenters' ... High list, dis 40&10 %
" Round Gilt ... ℘ gross $5.25 net
Dixon's Lead ... ℘ gross 4.50 net
" Lumber ... ℘ gross
Dixon's Carpenters' ... dis 40 & 10 %

Packing, Steam.
N. Y. Belting and Packing Co ... dis 20

Picture Nails.
Brass Head, Sargent's List ... dis 50&10 %
" T. & S. Mfg. Co ... dis 40 %
Porcelain Head, Sargent's List ... dis 50&10 %
" " Judd's List ... dis 30 %
Porcelain Head, T. & S. Mfg. Co ... dis 33⅓ %
Niles' Patent ... dis 25 %

Picks and Mattocks ... dis 35 %

Pinking Irons ... ℘ doz 75c. net

Plaiting Machines.
Magic ... ℘ doz $10.00, net
Astor Plaiting Machine ... each $15.00, dis 20 %
Crown Plaiting Machines ... dis 25 %
6 in., $6.00, 10 in., $8.00 each

Planes and Plane Irons.
Bench, First Quality ... dis 25&10 %
" Second " ... dis 30&10 %
Moulding ... dis 25&10 %
Bailey's (Stanley R. & L. Co.) new list Jan. '79. dis 20&10 %
The Stanley (S. R. & L. Co.) " " dis 20&10 %
Bailey's "Victor" ... dis 20&10 %
Defiance Adjustable ... dis 20&10 %
Laflin Mfg. Co ... dis 35 %
Plane Irons, Butcher's ... $5.50 to £
" Buck Bros ... $5.00 to £
" Auburn Tool Co.'s ... dis 20 %
" The Globe Mfg. Co. "Baldwin Iron" ... dis 20 %
" Ohio Tool Co ... dis 20 %
" Sandusky Tool Co ... dis 20

Pliers and Nippers.
Button's Patent ... dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers No. 2; 4 in. $20; No. 4, 7 in., $30 ℘ doz ... dis 45 %
Humason & Beckley Mfg. Co ... dis 33⅓ %
Gas Pliers ... dis 50 %
Eureka Pliers and Nippers ... dis 25 %
Russell's Parallel ... dis 25 %
P. S. & W. Cast Steel ... dis 35 %
" Tinners' Cutting Nippers ... dis 15 %

Plumbs and Levels.
Disston's ... dis 40 %
Stanley R. & L. Co.'s Pat. Adjustable ... dis 65&10 %
" " " Non-Adjustable ... dis 55&10 %
Chapin's Patent Adjustable ... dis 65&10 %
" Non-Adjustable ... dis 55&10 %
Standard Rule Co.'s New Adjustable ... dis 65&10 %
" " Non-Adjustable ... dis 65&10 %
Johnson's Patent Adjustable ... dis 65&10 %
Pocket Levels ... dis 65&10 %
Davis' Inclinometers ... dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger ... per doz $37.50, dis 20 %
Fletcher Post Hole Augers ... ℘ doz 36.00, dis 20 %
Vaughan's Post Hole—
6 in. $23.60; 7, 8 and 9 in. $25 per doz ... dis 15&10 %
Eureka Diggers ℘ doz. $40.00 ... dis 25&10 %

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw per doz $19.00, dis 20 %
" Pruning Hook ... " 12.50, dis 20 %
E. S Lee & Co.'s Pruner ... dis 30 %
Pruning Shears ... ℘ doz $5.50@$6.00

Pulleys.
Hot House and Tackle ... dis 60&10 %
Jap'd Screw ... dis 60&10&10 %
Brass Screw ... dis 60&10 %
Jap'd Side ... dis 60&10&10 %
" Clothes Line ... dis 60&10 %
Hay Fork Solid Eye, ... $4.50; Swivel, $5.00, dis 50&10 %
" " "Anti-Friction." ... $7.50 dis 40&5 %
" " "F" Common and Pat. Bushed ... dis 20 %
" " Tarbox Pat. Iron ... dis 20 %
Shade Rack ... dis 50 %

Punches.
Belt or Drive ... ℘ doz $2.00; 2.25; 2.50, dis 50 %
Bemis & Call Co.'s Cast Steel Drive ... dis 50&5 %
" " Springfield Socket ... dis 50&5 %
Spring ... ℘ doz $7.00, dis 50&5 %
" Leach's Patent ... dis 15 %
Bemis & Call Co.'s Spring and Check ... dis 40 %
Solid, Tinners' ... ℘ doz $1.44, dis 40 %

Rail.
Sliding Door Wrought Brass.....₩ D 45c dis 20
" " Iron, Painted .₩ foot 4c.dis 10&10
Barn Door....Inch..... ½ ⅝ ¾
Per 100 feet. $2.00 3.00 5.00—dis 10 %
" for N. E. Hangers—
Small. Med. Large.
Per 100 feet. .. ..$2.10 2.70 3.30—net

Razors.
J. R. Torrey Razor Co.....dis 15 %

Razor Strops.
Genuine Emerson.....dis 35 %
Badger's Emerson.....dis 40 %
Badger's (not Emerson).....dis 30
Evans'.....dis 40 %
Imitation Emerson.....₩ doz $2.00. dis 20 %
Hunt's.....dis 40&5 %
Chapman.....dis 15 @ 20 %
Saunde r's.....dis 10 %
Torrey's.....dis 20 %

Rivets.
Iron and Tinned.....dis 65 %
In bulk, list of May 21.....dis 45 %
Copper Rivets and Burs.....dis 33⅓ %
Nos.. " 8 9 10 11 12 13 14 15 &%
₩ D..400 500 520 540 560 580 600 640 700 &%
Burr's.....dis 45 %

Rivet Sets.

Rods.
Stair. Brass.....dis 20 %
Stair, Black Walnut.....dis 20&10 %
Stair. Amer can Patent.....dis 20 %

Rollers
Barn Door, Sargent's list.....dis 55&10 %
Novelty.....dis 10 %
Acme (Anti-Friction).....dis 40 %

Rope.—Wells' Net List, May 21, 1881. dis on 5000 lbs and over, 1½c ₩ D
Manila.....½ inch and larger ₩ D 15 c
" ..... ⅜ inch ₩ D 15½c
" .....7-16 and 1-16 inch ₩ D 16 c
" Tar'd Rope.....₩ D 14½c
" " Lath Yarn.....₩ D 16 c
" Hay Rope.....₩ D 15 c
Sisal.....½ inch and larger ₩ D 10½c
" .....⅜ inch ₩ D 11 c
" .....¼ and 7-16 inch ₩ D 11½c
" Hay Rope.....₩ D 10½c

Rules.

	Boxwood.	Ivory.
Chapin's, Standard, Stanley	dis 70&10 %	dis 60&10 %

Sad Irons.
From 1 to 10 lbs.....₩ D 35c net
Self Heating.....₩ doz $9.00 net
" Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons, Double Pointed.....dis 35 %
Mrs. Pott's Irons, Square Back.....dis 40 %
Enterprise Star Irons.....dis 40 %
Combined Fluter and Sad Iron..per doz $16.00, dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1½..$4.75 ₩ ream
" " " 2, 2½ & 3. 4.25 ₩ ream
" " " Assorted 4.75 ₩ ream
" " Star..... 3.75 ₩ ream
" " Emery..₩ ream $6.50 @ 11.50
Bartles Flint, same list as B & A.....dis. 25%
" Harrison, $3.75 per ream.....dis 25 %
New England, same list as B. & A. Flint.....dis 25 %
Gage's.....dis 20&2 %
dis 25&10

Sash Cord.
Common.....₩ D 14 @ 20c net
Patent.....₩ D 100 net
Silver Lake. Russia Flax.....₩ D 6 c. dis 10 %
White Cotton.....₩ D 6cc. dis 10 %
Drab Cotton.....₩ D 6¼c. dis 10 %
Raw Hide.....dis 25 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓%
Ferguson's.....dis 33⅓ %
Walker's.....net
Hammond's Window Springs.....dis 25 %
Northup Window Springs, No. 1, $10.00; ₩ gross..dis 15 %
The Perfect, Clark & Smith. Plain Jap'd ₩ gro $10.00 net
" " Por. Knob Jap'd. ₩ gro 14.00 net
" " Nickel-Plated...₩ gro 27.00 net
" Universal".....dis 30 %

Sash Weights.—Solid Eyes, in 500 ℔ lots and over.....₩ ℔ 1¾c net

Sausage Stuffers or Fillers.
Miles.....₩ doz. $20, dis 30 %
Perry.....₩ doz., No. 15; No. 0, $21, dis 35 %
Straw Cut No. 4.....each $30.00, dis 20 %
Enterprise Mfg. Co.....dis 25 %
Silver's.....dis 25%

Saws.
Disston's Circular.....dis 4 %
" Mill.....dis 40 %
" Cross Cut.....dis 10 %
" Hand. Panel, Rip, &c.....dis 20 %
Boynton's Lightning, Cross Cuts, new list.....dis 20 %
" One-Man. all lengths, " .....dis 20 %
" Billet Webs, 30 in. " .....dis 25 %
" Lightning Buck Saws X Far.....dis 25 %
" Lightning Hand, Panel and Rip.....dis 25 %
Wheeler & Csemson Mfg. Co.'s Hand.....dis 20 %
W. M. & C. Mfg. Co. Cross-Cuts, except Monarch, dis 20 %
Livingston's Butcher and Kitchen.....dis 20 %
Framed Wood—

Nos....	101	103	103	104	105
Per doz..	$10.00	8.40	10.00	7.50	6.25 net

Saw Frames.
White, Vermont.....₩ doz $1.35, dis 25 %
Red, Polished and Varnished.....₩ doz $2.00, dis 10 %
Saw Rods.....$10 list dis, 10&2&5 %

Saw Sets.
Boynton's Patent X Cut, per doz. $12.00; Hand Saw, per doz., $10.00.....dis 20 %
Stillman's Genuine.....₩ doz $3.40 and $5.40 dis 10 %
" Imitation.....₩ 00 $3.25, dis 10&10 %
Common Lever.....per doz $2.00, dis 30&10 %
Leach's.....No. 0, $8.00; No. 1, $15.00. dis 15 %
Nash's.....No. 1 $8.50; No. 3, $5.50, dis 20&10 %
Hammer, Hotchkiss.....$5.50, dis 10 %
" Bemis & Call Co.'s New Pat.....dis 40&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
" " Plate.....dis 10 %
" " Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00. dis 60&10 %
" Imitation.....$7 00. dis 60 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %

Scales.
Hatch, Counter, No. 171.....₩ doz $36, dis 35&10 %
" Tea, No. 161.....₩ doz $16.00 dis 40&10 %
Union Platform.....$5.00. dis 45 %
Fairbanks'.....dis 20 %
Buffalo Scle Co.....dis20&5 %
Howe's.....dis 20&5 %
Chatillon's Grocers'.....dis 45 %
" Eureka.....dis 50 %
Family Universal.....dis 30 %
" Favorite.....dis 30 %
" Turnbull's.....dis 30 %
Scale Beams, Chatillon's list.....dis 10 %
" Sargent's list.....dis 50&10 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.50.dis 20&10 %
Box, 1 Handle.....₩ doz $4.00, dis 10 %
" 2 " .....₩ doz 6.00 dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 55 %
Ship (common).....per doz $3.00 net
" (Providence Tool Co.....dis 10 %

Screw Drivers.
Douglass Mfg. Co.....dis 20&10&10 %
Disston's.....dis 40 %
Disston's Patent Excelsior.....dis 40 %
Buck Bros.....dis 25 %
Stanley Rule & Level Cos., Varnished Hdls...dis 50&10 %
" " Black Handles...dis 40&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet per doz., 4 in., $9.00; 5 in., $10.20; 6 in., $12.00 dis 30 %
Cowles Hdw. Co., No. 1 Extra.....dis 40&10 %
" " No. 1.....dis 50&10 %
" " Nos. 4 and 00.....dis 50 %

Screws.
Flat H'd Iron.....New list, April 27, 1881.....dis 40 %
Round Head Iron. " " " .....dis 35 %
Flat Head Brass... " " " .....dis 40 %
Round Head Brass " " " .....dis 30 %
brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 25&10 %
Coach Patent Gimlet Point, List per 100.....dis 65 %
Coach, Common.....dis 10 %
Bed.....dis 10 %
Machine, Flat Head, Iron, Am. Screw Co.....dis 55 %
" Round Head, Iron, " " .....dis 50 %
Bench, Iron.....dis 60&10 %
" Wood, Beech.....₩ doz $3.00, dis 10 %
" " Hickory.....dis 20&10 %
Band.....dis 25&10 %
Hand Rail, Sargent's.....dis 60%&10 %
" " Humason, Beckley & Co's.....dis 50 %
" " Am. Screw Co., list of Jan. 1, '81.dis 60&10 %
Jack (Wilson's).....dis 20 %

Screw Window Balances.
R. B. Hugunin's.....$36.00 per gross, dis 25&10&5 %

Scroll Saws.
Lester, $10.00.....dis 20 %
Rogers, $3.50.....dis 25 %

Shears and Scissors.
American (Cast) Iron.....dis 70&10 %
Clipper Cast Iron.....dis 70&10
Pruning.....see Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....dis 15 %
Seymour's, List, Nov. 25, 1879.....dis 60&10 %
Heinsch's " " .....dis 60&10 %
" Tailors' Shears.....dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.....dis 75 %

Sheaves.
Sliding Door, M. W. & Co., list.....dis 45&2 %
" R. & E. list.....dis 60&10 &2 %
" Patent Roller.....dis 10 %
" " Hatfield's.....dis 65&10 &2 %
" Russell's Anti-Friction ...dis 60&10 &2 %
" Moore's Anti-Friction.....dis 45 %
Sliding Shutter, R. & E. list.....dis 60&10 &2 %
" " Sargent's list.....dis 65&10 %
" " Reading list.....dis 55&10 %
Moore's Anti-Friction (Hanging).....dis 45 %

Shovels and Spades.
Ames, New list, Jan. 20, 1880.....dis 12½%
Griffiths.....dis 40&10 %
Old Colony.....dis 12½ %
Payne Pettebone & Son, new list.....dis 40&10 %
" " R. R. Shovels.....dis 15 %
Remington's (Lowman's Patent).....dis 25 %
Rowland's.....dis 40&10 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 50&10&2 %
Polished Steel.....new list. dis 50&10&2 %

Slates.
Square Frames.....by case.....dis 70 %
Less than a case.....dis 65&10 %

Spoke Shaves.
Defiance Metallic.....dis 20&10 %
Iron.....dis 45 %
Wood.....dis 30&10 %
Bailey's (Stanley R & L. Co.) new list.....dis 30&10 %
Stearns'.....dis 25&10 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00 dis 40&5 %
Stearn's.....₩ doz $10.00 dis 40 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 50&10 %
Douglass'.....₩ doz $9.00. dis 15 %

Spoons.
Basting.....dis 55 %
Riveted Table and Tea.....dis 55 %
Solid Table and Tea.....dis 55 %
Britannia.....dis 70 %
The Wm. Rogers Mfg. Co.....dis 40&5&2 %
Reed & Barton.....dis 40&5&2 %
Hall & Elton.....dis 40&5&2 %
Holmes, Booth & Haydens.....dis 40&5&2 %
German Silver.....dis 30&10&2 %
Cast Steel, Sil. Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
" " Tables.....$2.00 ₩ gross, net
Tin Cowles Hdw. Co.).....dis 10 %
" " " case lots.....dis 20 %

Stocks and Dies.
" Lightning " Screw Plate.....dis 10 %

Stone.
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ ℔ 0c, dis 33⅓&10 %
Washita Stone.....No 1. ₩ ℔ 18c net
" .....No 2. ₩ ℔ 14c net
" Slips.....No. 1, ₩ ℔ 40c net
Arkansas Stone No. 1, 4 to 6 in.....℔ ₩ $1.35 net.
" " No 1, 6 to 9 in.....℔ ₩ $2.00 net
Turkey Oil Stone (Chase).....4 to 8in, $1.00 ₩ ℔,
" Slips " .....$2.50 ₩ ℔ dis 10 %
Lake Superior (Chase).....₩ ℔ 20c, dis 10&5 %
" Slips " .....₩ ℔ 45c, dis 10&5 %
Grindstones. Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $6.00 dis 10 %
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 5 %
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $4.75, net
Dixon's Plumbago.....₩ ℔ 8c, net

Squares.
Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 %; full cases, dis 50&10 %
Nickel Plated.....add $2.50 @ $4.00 ₩ doz. net
Try Squares and T Bevels.....dis 50&10
Disston's Try Square and T Bevels.....dis 40 %
Winterbottom's Try and Mitre.....dis 20&10 %
2 % cash

Tacks, Brads, &c.
List of April 2, 1880

Tinned Swedes Tacks	dis 45 %
Tinned American "	dis 55 %
Swedes Tacks, all kinds	dis 30 %
Copper Tacks and Nails	dis 30 %
Swedes Hungarian Nails	dis 30 %
American "	dis 30 %
Gimp and Lace Tacks	dis 30 %
Finishing Nails	dis 25 %
Trunk and Clout Nails	dis 25 %
Common and Patent Brads	dis 20 %
Basket Nails	dis 25 %
Brush Tacks	dis 20 %
Leathered Carpet Tacks	dis 20 %
American Cut Tacks	dis 25 %
Cigar Box Nails	dis 25 %
Chair Nails	dis 25 %
Double-Pointed Tacks	dis 40&5 %

Extra 10 % on all.

Tap Borers.
Common and Ring.....dis 15 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 25 %

Tapes, Measuring.
American.....dis 20 %
Spring Tapes.....dis 25&10 %

Thermometerr.
Tin Case.....dis 70 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 25 %
Wood Bottom.....₩ doz $12.00, dis 40 &5 %
All Iron.....₩ doz $9.50, dis 40&5 %
Nashua Lock Co.'s.....₩ doz $18 00, dis 60&5 %
Wilson's.....dis 35 %

Toe Calks.—Winsted.....₩ ℔ 9c. dis 5

Tinners' Tools and Machines.
Machines (P. S. & W.).....list add 20 %
Tools (P. S. & W.).....add 6 %

Transom Lifters.
Wollensak's Patent.....dis35 %
Richer's Patent.....dis 20&10&10 %

Traps.
Game, Newhouse.....dis 30 %
" Oneida Pattern.....dis 50 @ 55 %
" Blake's Patent.....dis 40 %
Mouse, Wood, Choker.....₩ doz holes, 10½c
" Round Wire.....₩ doz $1.50, dis 10 %
" Cage " .....₩ doz $2.50, dis 10 %
" Catch-em-alive.....₩ doz $2.50, dis 10 %
Rat. "Decoy".....per doz $10.00, dis 10 %

Trowels.
Lothrops Brick and Plastering.....dis 25 %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis 30 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 20 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 55&10 %

Triers.
Butter and Cheese.....dis 25%

Vises.
Solid Box.....List. of July 1, '79 dis 30 %
" "Crown" (A. H. Hildick) 40 to 100 ℔, 15c net
" Peter Wrights.....15½c
" Wilkinson's.....13½c
Parallel, Parker's.....dis 10 %
" Wilson's.....dis 45 %
" Howard's.....dis 20&10 %
" Merrill's.....dis 15 %
" Sargent's.....dis 60&10 %
" Trenton.....dis 30 %
" Backus and Union.....dis 40 %
" Oval Slide.....dis 40 %
" Double Screw Leg.....dis 15&10 %
" Prentiss.....dis 25 %
" Simpson's Adjustable.....dis 25 %
"Family." List.....net
Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10 %
" Stearn's.....dis 20&10 %
" Hopkins'.....₩ doz $17.50 dis 10 %
Reading.....dis 40&10 %
Lowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

Washer Cutters.
Smith's Patent.....₩ doz $12.00 dis 25 %
Johnson's.....₩ doz $12.00. dis 33⅓ %
Penny's.....₩ doz $14.00 and $16.00. dis 45 %
Appleton's.....₩ doz $16.00, dis 60&10 %

Washers.—See Nuts and Washers.

Well Wheels.—Revised list.....dis 60&10%

Wire.
Brass and Copper.....List of June 10, 1880....dis 20 %
Bright and Annealed.....Nos. 0 @ 18. dis 55 %
" " .....Nos. 19 @ 26, dis 60 %
" " .....Nos. 27 @ 36. dis 65 %
Coppered.....Nos. 0 @ 18.dis 50 %
Galvanized, Nos. 0 to 6.....₩ 100. dis 40 %
" Nos. 7 to 18.....market list. dis 40 %
Tinne Nos. 0 to 18.....dis 45 %
Cast Steel.....dis 30 %
Tinned Broom Wire, Nos. 18 to 25.....dis 50 %
Annealed Fence, Nos. 8 and 9.....dis 55 %
" Grape, Nos. 10 to 14.....dis 55 %
Galvanized Telegraph, Nos. 7 to 9.....₩ D 90
" " Nos. 10 and 11.....₩ D 100
" " No. 12.....₩ D 10½c
Fence Staples.....₩ D 7½@ 7¾c
" Staples, Galvanized.....₩ D 8¼ @ 8½c
Stubs Steel Wire.....$7.00 to £
Japanned Barb Fence.....₩ D 9c
Galvanized " .....₩ D 10c
Steel Music Wire, Nos. 12 to 27.....₩ D $1.25. net
Turner & Seymour Mfg. Co., Picture Wire..dis 80&20 %
Judd's Picture Wire.....dis 80&20 %
Clothes Line Wire, Galvanized.....₩ coil 25@40c net
Wire Cloth, green and drab.....₩ sq. ft, 3 c net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S," ....list Jan., 1880. dis 15&10 %
" Diagonal.....dis 15&10 %
Coes 'Genuine.....dis 50 %
" "Mechanics".....dis 50&10 %
" Pattern, Malleable.....dis 70&10 %
Girard Standard.....dis 50&10 %
Girard Agt.....60&10 %
Bemis & Call's Patent Combination.....dis 20 %
" " Merrick's Pattern.....dis 35 %
" " Briggs' Pattern.....dis 25 %
" " Cylinder or Gas Pipe.....dis 40 %
Van Wagoner & Williams' Basin.....per doz $4.50
Aiken Pocket (Bright).....$6.00. dis 60&10 %
The Favorite Pocket (bright).....per doz $8, dis 60 %
Webster's Pat. Combination.....dis 25 %

Wringers.

	Per doz
Universal, XX No. 3½	$60.00
" " No. 3	63.00
" " No. 1½	71.00
" " No. 1.	93.00
" " No. 8..	each, 12 00
" " No. 12.	" 20.00
" " No. 18.	" 25.00
" " No. 32.	" 32.00
Peerless, No. 0, no Cogs	41.00
" No. 1, "	54.00
" No. 2½, with Cogs	60.00
" No. 3, "	64.00
" No. 3, "	71.00
" No. 4, "	89.00
Unique, No. 0	51.00
" No. 1	54.00

dis 25 %

NEW YORK WHOLESALE PRICES, May 25, 1881.

METALS.

IRON.—DUTY Bars, 1 to 1½c. ₩ lb; Sheet, Band Hoop and Scroll, 1¼ to 1¾c. ₩ lb; provided, that none of the above iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₩ ton; Polished Sheet, 3c. ₩ lb; Wrought Scrap, $8 ₩ ton; Cast Scrap, $6 per ton. Railroad 70c. ₩ 100 lbs. Boiler and Plate, 1¼c. ₩ lb.

Iron—AMERICAN		
Foundry No. 1	₩ ton	$24.00 @ 25.00
" No. 2X	₩ ton	22.00
Gray Forge	₩ ton	20.00 @
SCOTCH.		
Eglinton	₩ ton	21.50
Carnbroe	₩ ton	22.00
Coltness	₩ ton	23.50 @ 24.00
Glengarnock	₩ ton	22.50
Gartsherrie	₩ ton	22.50 @ 25.00
Rails.		
Iron	₩ ton	$48.00 @ 50.00
Steel (at mill)	₩ ton	40.00 @ 00.00
Old Rails (Nominal)	₩ ton	26.50 @ 27.50
Scrap.		
Wrought Scrap	₩ ton	28.00 @ 30.00

Bar Iron, from Store.—

Common Iron:		
¾ to 1 in. round and square; 1 to 6 in. x¾ to 1 in.	₩ lb	2.30
Refined Iron		
¾ to 2 in. round and square; 1 to 6 in. x¾ to 1 in.; to 6 in. x¼ and 5-16	₩ lb	2.40 @ 2.50
Rods—¾ and 11-16 round and square	₩ lb	2.3 @ 2.6c
Bands—1 to 6x3-16 to No. 12	₩ lb	2 @ 3.1c
Norway Nail Rods		6¼ @ 6½c

Sheet Iron.

	Common American	R. G. American.
10 to 20	₩ lb 3¾	5
21 to 24	₩ lb 3¾	5
25 to 26	₩ lb 4 c	5¼
27	₩ lb 4¼c	5½
28	₩ lb 4½c	5¾

	B.B.	3d qual.
Galvanized, 10 to 20	₩ lb 7¾c	70
" 21 to 24	₩ lb 8¼c	7½c
" 25 to 26	₩ lb 90	80
" 27	₩ lb 9½c	8½c
" 28	₩ lb 10½c	9c

Patent Planished ₩ lb 11c; B, 10c
Russia 11¾ @ 12½c
American Coin Rolled ₩ lb 5 @ 7½c

COPPER.—DUTY: Pig, Bar and Ingot, 5c; Old Cop per 4c lb; ₩ Manufactured (including all article of which Copper is a component of chief value), 45 % ad valorem.
American Ingot ₩ lb See Trade Report

SHEATHING, BRAZIERS COPPER, BOLTS, &c.

Braziers' Copper, ordinary sizes, 16oz. per sq. ft., and over per lb 28c
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz., ₩ sq. ft. ₩ lb 30c
Braziers Copper 10 oz and 12 oz., ₩ sq. ft. ₩ lb 32c
" Lighter than 10 oz. ₩ sq. ft. ₩ lb 34c
Circles less than 84 in. in diameter ₩ lb 31c
Circles 84 in. diameter and over ₩ lb 34c
Segment and Pattern Sheets ₩ lb 31c
Locomotive Fire Box Sheets ₩ lb 26c
Sheathing Copper, over 12 oz. ₩ sq. ft. ₩ lb 26c
Bolt Copper ₩ lb 28c
Copper Bottoms ₩ lb 29c
No Copper is Sheathing except 14 x 0 inches and not to exceed 34 oz. to the sq. ft.

TINNING.

4x8 ₩ sheet 6c
All other size Sheets, 2½c. per square foot.
For tinning both sides, double the above amount

O'REILL'S PATENT PLANISHED COPPER.—Net.

14 and 16 oz. and heavier	₩ lb	36c By the case. ₩ lb 35c
12 oz. and lighter	₩ lb	39c " " ₩ lb 38c

Boiler Sizes.

7 in., 14x52. 8 in., 14x56. 9 in., 14x60.
14 and 16 oz. and heavier. ₩ lb 38c By the case. ₩ lb 37c
(And all sizes not over 20 in. wide.
50x50.
14 and 16 oz. and heavier ₩ lb 40c
oz ₩ lb 43c

Brass.

Brown & Sharp's Gauge the Standard for Metals. Old English Gauge the Standard for Wire.
BRASS MANUFACTURERS' PRICE LIST.—dis 20%. June 10, 1880.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c ₩ lb.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in. 30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive 35c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive 38c
½c ₩ lb advance on each No. above Nos. 28 to 38, inclusive.
All Brass thinner than No. 8 is Platers' Brass, at 43c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 37c
Printers' Rules 45c
Sheets wider than 30 in. and under 40 in 47c
" 40 in and over 50c
Circular Sheets, in diam. from 4 in. to 14, inclusive 40c
" " over 14 " 20, " 45c
" " " 20 " 30, " 49c
" " " 30 " 40, " 55c
" " 40 in 59c

LOW BRASS.

40 ₩ lb more than High Brass,
Gilding Metal, 8c ₩ lb more than High Brass.
Platers' or Gold Metal { In Bars 48c; Sawed 51c; Planed or Polished 54c

FOR SLITTING.

Metal in width in. to ¼ in. to No. 28, inclusive, 1c. ₩ lb advance.
Metal, in width 2 in to 1 in. thinner than No. 28, 2c. ₩ advance.
Metal, in width 1 in. to ¼ hinner than No. ₩ lb advance.
Metal, in width ¼ in. to ¼, inclusive, not thinner than No 28, 2c. ₩ lb advance.
Metal, in width ¼ in. to ¼ thinner than No. 28, 5c. ₩ lb advance.
Metal, ¼ in. in width and less, 10c. ₩ lb advance.
Any of the above widths cut to particular lengths, add 7c. ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE

	Market Metal.	Wire.
4 per cent., 12 inch, to No. 26	$0.42	$0.70
6 " " "	65	76
10 " " "	64	.88
15 " " "	.74	1.03
12 " " "	.90	1.12

German Silver Sheets over 12in. wide and weighing more than 10 lbs., $2.00 ₩ lb.
Advance 2c. for each additional inch in width above 12 in., and 2c. ₩ lb on each No. thinner than Nos. 26 to 36, inclusive
All German Silver thinner than No. 36 is Platers, at 50c ₩ lb additional.
Germad Silver Scrap one-half less than net price of 12 in Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Gild'g and Copper.
No. 0 to 20	$0.33	$0.37	$0.13
No. 21	.36	.40	.46
No. 22	.37	.41	.47
No. 23	.38	42	.48
No. 24	.40	.44	.50
No. 25	.43	.47	.51
No. 26	.45	.49	.55
No. 27	.46	.52	.58
No. 28	.52	.56	.63
No. 29	.55	.59	.66
No. 30	.58	.62	.72
No. 31	.62	.66	.78
No. 32	.66	.70	.84
No. 33	.70	74	.93
No 34	.74	.78	1.03

Spring Wire 2c ₩ lb advance.
Flat, Square and Half Round Wire 5c ₩ lb advance on Round Wire.
Fancy Wire not less than 10c ₩ lb advance of Round Wire.
Brass Rods, No. 8 and larger, not less than 2 feet lengths. 38c.
Wire straightened and cut, smaller than No. 8 and not less than 2 feet lengths, 43c.
Wire and Rods less than 2 feet lengths, special rates
Twelve cents per lb extra for spooling on 1 lb spools.

MISCELLANEOUS.

Brass Pail Ears $0.50
Brass Door Rail .43

SCRAP.—dis. 20 %

High Brass Scrap 12c
Low " 14c
Gilding " 10c
Turnings, Filings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis 20 %

	₩ lb
Plain No. 2 inclusive above ¼ in. to 3 in.	$0.43
" above 3 in	.53

Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.

Plain, ¼ inch	.70
" 3/16 "	1.10
" 1/8 "	1.60

All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No 20 50c
English, Scotch and Extra Patterns Fancy Tubing to No. 20 55c
Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ¼ cent for each additional cutting under 2 feet.
All Mandrel Drawn Tubes under ¾ in., 25 cents per pound advance.

ZINC TUBING—dis 20 %.

Plain	.27
Fancy	.31
Scotch and Extra Patterns	.32

GERMAN SILVER TUBING.—dis 10 %

4 Per cent	.80
6 "	.90
9 "	1.05
12 "	1.20
15 "	1.35
16 "	1.40
18 "	1.50
20 "	1.60

STEEL.—DUTY: Bars, Ingots, Sheets and Coils valued at 7 cents ₩ lb., or under, 2¼ cents; over, 7 cents, and not above 11, 3 cents ₩ lb; over 11, 3½ cents ₩ lb, and 10 % ad val. Railway Bars, 1¼ cents ₩ lb. Railway Bars, in part Steel, 1 cent ₩ lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel,—		
" Best Cast	₩ lb	15½c
" Extra Cast	₩ lb	16½c
" Round Machinery, Cast	₩ lb	10c
" Swaged, Cast	₩ lb	18c
" Best Double Shear	₩ lb	15½c
" Blister, 1st quality	₩ lb	13c
German Steel, Best	₩ lb	11c
" 2d quality	₩ lb	10c
" 3d quality	₩ lb	9c
Sheet Cast Steel, 1st quality	₩ lb	15½c
" 2d quality	₩ lb	14½c
" 3d quality	₩ lb	12½c

ANTIMONY See Trade Report
LEAD.—DUTY Pig $2 ₩ 100 lbs; old Lead, 1½c ₩ lb. Pipe and Sheet, 2½c ₩ lb.

American		4¾ @ 4¾c
Bar		6c net
Pipe		6½c dis 10 %
Tin Lined Pipe		14c, dis 10 %
Sheet		7c. dis 10 %
Shot		Drop 7¾c, Buck, 8½c
Chilled Shot		8½c

BABBITT METAL.

N. P. U	₩ lb	7¾ @ 8c
A. 25c; B, 20c; C, 15c.		

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1.1c ₩ lb; Elecro-galvanized Plates, 2c ₩ lb; Manufactures of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent.

Banca	₩ lb	26 @ 26c
Straits	₩ lb	22 @ 22½c
English		22 @ 22½c

TIN PLATES.

I C 10X14 } 14X20 }	Prime Charcoal	$6.25 @ $6.50
I C 12X12	"	6.50 @ 6.75
I X 10X14 } 14X20 }	Charcoal	8.25
I X 12X12	"	8.50
D C 12½X17		5.75
D X 12½X17		7.75
For each additional X add		2.00

COKE TIN PLATE.

	Best.	Ordinary.
I C 10X14 } I C 14X20 }	$6.00	5.25 @ 5.75
I C 12X12	6.25	5.50 @ 5.75

TERNE PLATE.

	Prime Char.	2d qual.	Coke.
I C 14X20	$5.75	5.50	5.25
I X 14X20	7.50		
I C 20X28	11.50	11.00	10.50 @ 11.00
I X 20X28	15.50		
I C 20X200	19.00		
I C 14X20 M. F. Brand			7.50

SOLDER. No. 1, 12c @ 13c; No 2, 11c
SPELTER.—DUTY: in Pigs, Bars and Plates, $1.50 ₩ 100 lbs.

American, cash	5¾ @ 5¾ c
Bergen Port from Lehigh Ore	10c
Lehigh, on spot	6c

ZINC.—DUTY: Pig or Block, 1.50 ₩ 100 lbs. Sheet 3½c ₩ lb.

Sheet, Cask	7 @ 7½c
" Open	7½ @ 8c

Paper Stock, &c.

(Dealers' Selling Price.)

White Shirt Cuttings, No. 1		6¼ @ 6¾
" " No. 2		5 @ 5¼
Mill Assorted Whites		5¼ @ 5½
Unbleached Muslins		6¼ @ 6¾
City Whites, No. 1		4½ @ 4¾
New Canton Flannels		6 @ 6¼
New Seconds, light		4¼ @ 4½
" dark		3½ @ 3¾
No. 2. Whites		2¾ @ 3
Cotton Canvas		4¾ @ 4½
Linen Canvas, No. 1		4½ @ 4¾
Seconds, City No. 1		2 @ 2
" No. 2		1¼ @ 1½
Colors, per 100 lbs		75 @
Manila Rope		3¼ @ 3¼
" Tarred		2½ @ 2¾
Gunny Bagging, No. 1		2½ @ 2¾
" No. 2		1¾ @ 2
Kentucky Bagging		4¼ @ 4½
Burlap Bagging, No. 1		2¾ @ 2¾
Tar Shakings		2 @ 2½
Hemp Twine Stock		4¼ @ 4¾
Hard White Shavings, No. 1		4 @ 4¼
Soft White Shavings, No. 1		3¼ @ 3¾
White Shavings, No. 2, soft		3 @ 3¼
Mixed Shavings, part white		3 @ 3½
Ledger and Writing		3¼ @ 3½
Solid Stock		3¼ @
Book Stock, No. 1, light		1½ @ 1¾
Old Newspapers		1¾ @ 2
Pure Manilas		2½ @ 2¾
Bogus Manilas and Hardwares		1½ @ 1¾
Commons		90 @
Binders' Board Cuttings		1½ @ 1¾
Straw Board Cuttings		1¼ @ 1½

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₩ lb	20c
" " Ordinary		6c
" Ivory Drop, fair		12 @ 15c
" " best		25c
Black Paint, in oil	Kegs 8c	asst'd cans, 11c
Blue Prussian, fair to best		40 @ 55c
" " in oil		45 @ 55c
Blue Chinese dry		70c
" Ultramarine		18 @ 32c
Brown, Spanish		15c
" Van Dyke		10@12c
Green, Chrome		15 @ 23c
" " in oil		14 @ 18 @ 25c
" Paris	good 25c; best, 30c	
" " in oil	" 30c;	45c
Iron Paint, Bright Red	₩ lb	2½c
" Brown	₩ lb	2½c
" Purple	₩ lb	3c
" Ground in Oil, Bright Red	₩ lb	5½c
" " " Red	₩ lb	5c
" " " Brown	₩ lb	4½c
" " " Purple	₩ lb	6c
Mineral Paints		1¼ @ 4c
Orange Mineral		10c
Red Lead, American		7½c
" Venetian (N. C.) dry		$1.65 @ $1.70
" in oil	asst'd cans, 11c; kegs, 8c	
" Indian dry		9 @ 12c
Rose Pink		10 @ 13c
Sienna, American, Raw		4c
" Burnt		4½c
" " in oil		10 @ 16 @ 20c
" Raw		11 @ 15 @ 25c
Umber, Burnt		4 @ 8c
" " in oil		9 @ 12 @ 16c
" Raw		3½ @ 7½c
" " in oil		10 @ 16 @ 18c
Vermillion, Chinese		90c
" English		55 @ 57½c
" Trieste		1.10c
" American, Common		15c
White Lead, American, pure dry		6¼ @ 7c
" " " in oil		7½c
White, Paris, English, prime	12 bbls. 2 @ 2½c	
Yellow Ochre, French		$1.75
" " " in oil	asst'd cans, 11c; kegs, 8c	
" " Vermont	in casks, 1½c	
Yellow Chrome		17 @ 27c
" " in oil		14 @ 18 @ 25c
Zinc White American No. 1, dry		5 @ 6¼
" " No. 1, in oil		6c
" French (Paris) dry		8 @ 10c
" " in oil		10 @ 11c

Oils.

Linseed, Raw in casks and bbls	gal.	54 @ 55c
" Boiled. "	"	57 @ 58c
Bleached Whale	₩ gal.	57c
" Sperm	₩ gal.	$1.00
" Elephant		63c
Signal		70c
Prime Lard		82c
No. 1		69c
West Virginia		120 @ 100
Drilling		40c
Empire Cylinder		64c
Miners' Oil		35 60 40c
Fish Oil, pressed		37 @ 42c
Neatsfoot		75c
Tallow		60c
Machinery		40c
Engine		50c

Sundries.

Asphaltum Cuban		6c @ 8c
" Egyptian		8½ @ 9c
Benzine	₩ gal.	11c
Chalk		¾c
" Block		¾c
Dryer, Patent, Am'n	asst cans, 9c;	kegs, 7c
Frostings		40c
Glue, White		24 @ 35c
" Sheet		20c
Glaziers' Points, Zinc		80
Gum, Copal		30c
" Damar		20c
" Shellac, English		44c
" " dark		40c
Litharge, English		7½c
Pumic Stone, selected Lumps		4 @ 6c
" powdered		2½c
Putty, in bladders		3 c
" in bulk		2½c
Rosin—Common and Good—Strained		$1.90
E & F		$2.15
G & H		$2.15 @ 2.35
I & K		$2.50 @ 2.75
M & N		$3.00 @ 3.50
Spirits Turpentine		38c
Whiting Spanish		¾c
Waste, No. 1 Cop		10c
" No. 1 White Machine		10c
" No. 2 "		9½c
" No. 1 Colored		7c
" No. 2 "		6½c
" Washed Machine		9c

Glass.

FRENCH WINDOW GLASS.
Prices current per box of 50 feet.

Single Thick.—Discount 50 & 10 %

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 6.50	$ 5.75	$ 5.50	$ 5.25
11 x 14 to 16 x 24	7.25	6.75	6.25	6.00
18 x 22 to 20 x 30	9.25	8.50	7.75	7.25
15 x 36 to 24 x 30	10.25	9.25	8.25	
26 x 28 to 24 x 36	11.00	10.00	9.00	
26 x 36 to 26 x 44	11.75	10.75	9.50	
26 x 46 to 30 x 50	13.25	12.50	10.50	
30 x 52 to 30 x 54	14.00	13.00	11.25	
30 x 56 to 34 x 50	15.00	13.75	12.50	
34 x 58 to 34 x 60	16.50	15.00	13.25	
36 x 60 to 40 x 60	17.50	16.00	15.00	

Double Thick.—Discount 50 & 10 %.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 8.25	$ 7.75	$ 7.50	$ 7.00
11 x 14 to 16 x 24	10.00	9.25	8.75	8.25
18 x 22 to 20 x 30	12.75	11.75	10.75	
15 x 36 to 24 x 30	14.25	13.00	11.75	
26 x 28 to 24 x 36	15.25	13.75	12.50	
26 x 36 to 26 x 44	16.25	14.75	13.00	
26 x 46 to 30 x 50	17.50	16.75	14.25	
30 x 52 to 30 x 54	18.50	17.25	14.75	
30 x 56 to 34 x 54	19.50	18.25	16.25	
34 x 58 to 34 x 60	20.50	19.50	18.00	
36 x 60 to 40 x 60	23.00	21.00	20.00	

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. Any size over 42 inches in length, and not making more than 81 united inches will be charged in the 84 united inches bracket.

BRANFORD LOCK WORKS'
Oriental Pattern Drawer Pull.

Full Size Cut of No. 175.

Illustrated catalogue furnished to the trade free on application.

Manufactory and Office,

BRANFORD, CONN., U. S. A.

THE STANLEY WORKS,

MANUFACTURERS OF

Wrought Iron Butts, Hinges

AND

DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES: New Britain, Connecticut.

WAREHOUSE: 79 Chambers St., New York.

STANDARD

CLARK'S NEW
Door Spring and Spring Butt.

(CUTS ARE FULL SIZE.)

The Simplest, Cheapest and Best in Use.

Require no special tool or wrench to tighten or release the tension; a nail or any thin piece of iron will do it.

Prices and Samples on application.

MADE BY

THE CLARK HARDWARE CO.,

DETROIT. MICH.

PHILADELPHIA SCREW CO., Limited,

Twelfth and Buttonwood Streets, PHILADELPHIA.

Manufacturers of

IRON & BRASS WOOD SCREWS.

Quality, finish and tests as to strength guaranteed equal to any in the market.

With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.

HUBBELL'S
PATENT
METAL
CORNERS
FOR OIL CLOTHS.

Protect them from wearing and are ornamental; **83,500** sold in four months. The real merits of these goods make them standard.

Orders solicited and circulars sent on application.

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Northville, Fulton County, N. Y.

COVINGTON WIRE WORKS

FRED. J. MEYERS,
Manufacturer of
Champion Fly Traps,
(Under Harper & Parker Patents)
Dish Covers,
Cheese Safes,
Bird Cages,
Wire Counter Railings,
Wire Cloth of Every Description.
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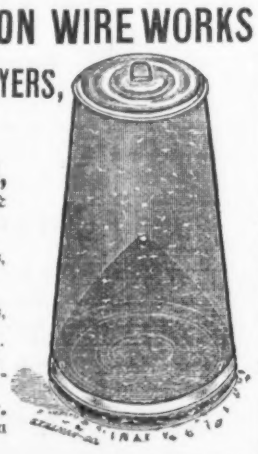
419 & 421 Madison Street,
Covington, Ky.
Send for illustrated catalogue of 1881.



The Iron-Masters'
LABORATORY.

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.

With Branch at Warrenton, Virginia,

J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore	$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do	12.50
For each additional constituent of usual occurrence	1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel	7.00
For each additional constituent of usual occurrence	6.00
For the per cent. of Carbonate of Lime, and insoluble Silicious Matter in a Limestone	10.00
or each additional constituent	2.00
or the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal	12.50

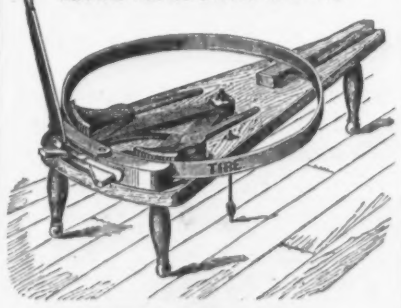
For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.

For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application

BLACKSMITHS, HARDWARE

MEN AND AGENTS SHOULD READ THIS.



LITTLE GIANT
WAGON TIRE UPSETTER.

This machine is strong, durable and cheap, and it superior to all others for upsetting or shrinking wagon tires, and bars of Iron without cutting them. I will upset tires one inch at a heat and is adapteds to tires of any size or diameter. Every Blacksmith should have one; they are the best selling machines hardware merchants and agents ever handled. Price only $12.00. Send for circular.

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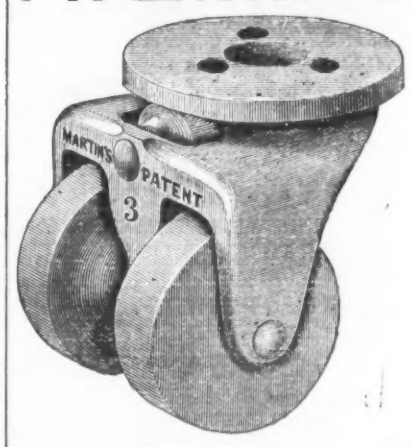
Millport, Chemung Co., N. Y.

EMPIRE STATE MFG. CO.
BUFFALO, N. Y.

Copper,
Half Copper,
Nickel Plated
TEA KETTLES.
Metal Spinning.

Office of
PHŒNIX CASTER CO.,
Indianapolis, Ind.



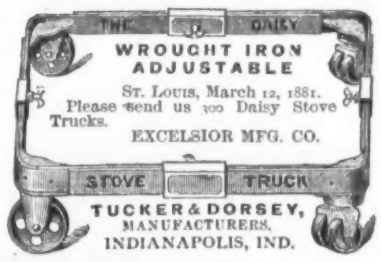
George A. Ruhleman & Co., St. Louis, Mo., have sold our Casters as follows:

1878	Amount,	$14.55
1879	"	246.76
1880	"	710.53

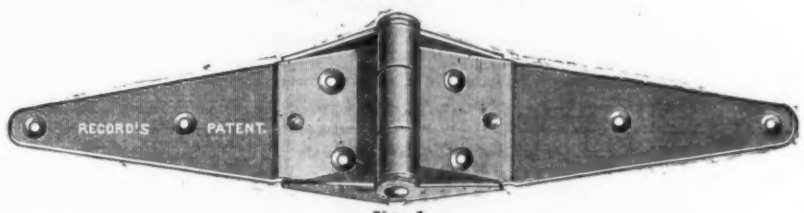
Our Caster is no experiment. The people will have it, if it does cost more than the shams on the market. Eight-inch Mill Files are no better stock. Introduce yourself to these goods by a very small stock order of our selection. Terms, 60 days. Ship them back if they fail in your esteem. Send for catalogue.

PHŒNIX CASTER CO.,
Manufacturers,
INDIANAPOLIS, IND.

Our Drawer is so uniform, simple, strong and effective, that it has nearly driven all competition from the field.



REDUCED PRICE LIST OF
RECORD'S PATENT HINGE.
CLASS No. 999.



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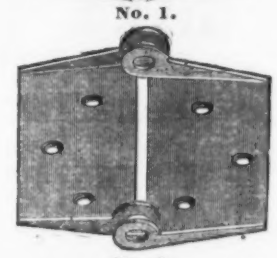


No. 2.

The above cuts represent Record's Patent Heavy Strap Hinge; No. 1, the completed Hinge; No. 2, the supports with flanges showing holes for pintle.

The main part of this Hinge is of the same style as the ordinary Heavy Strap.

The joint is strengthened by supports made of extra quality of iron, firmly riveted to the back of the hinge and having side ears flanged, spanning and doubling the entire width of the leaf, through which the pintle of the hinge passes, thus especially supporting the weaker part of the hinge, and adding greatly to its strength; also by the additional thickness of iron, greatly stiffening the hinge where most liable to bend, and secure against breaking where the greatest part of the strain comes.

As the straps of the hinge are bent down, forming an offset for the reception of the supports, the hinge is smooth or flat on the back, same as the ordinary strap hinge.

These hinges are neat in appearance, and owing to their great strength, admitting of smaller sizes being used than heretofore, they are the most economical as well as the most desirable hinges.

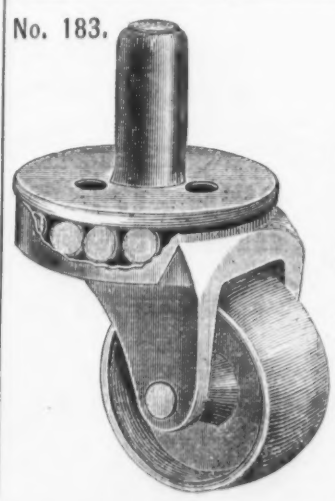
They can be applied the same as ordinary hinges.

SIZES	5,	6,	8,	10,	12 Inches.
Per dozen pairs	$2.00	$2.80	$4.40	$6.60	$9.40

Please use Class Number in ordering.

GEO. J. RECORD, Conneaut, Ohio.
FACTORY: Stanley Works, New Britain, Conn.

No. 183.



PAYSON'S
Patent "Anti-Friction"
Caster.

Can Never Wear Out or Fail to Act.

SENSITIVE, COMPACT AND HANDSOME.

Has plates riveted firmly together, with opening for screw driver. Works upon iron disks or rollers concealed from view, which relieve all friction and strain upon the stem, by placing the weight directly over the main wheel. No oil used on rollers. Made in all sizes and styles by

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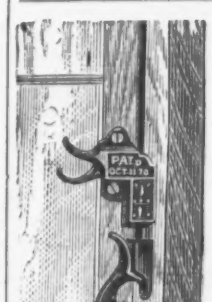
Boston Agent, A. T. YOUNG, 36 Pearl St.



KING'S SASH ADJUSTER.

Holds the upper or lower sash at any point.

Manufactured in bronzed and nickel plated.

Sample by mail on receipt of 40 cents.

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SOLE AGENTS,
BALTIMORE, MARYLAND.

THE AMERICAN MACHINE CO.,
MANUFACTURERS OF
HARDWARE SPECIALTIES.

Office and Factory: *Lehigh Ave. and American St., Philadelphia.*
Branch House: *No. 128 Chambers St., New York.*

SPECIALTIES: Fluting Machines, Hand Fluters, Plaiting Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.

Steel.

WOLFF, KAHN & CO.,

MANUFACTURERS OF

Steel Wire

For All Purposes.

Special Finest CAST STEEL WIRE,

MARKET STEEL WIRE, PRIME COPPERED SPRING WIRE, TEMPERED AND UNTEMPERED STEEL WIRES, IN LONG LENGTHS, FOR CRINOLINE, CORSET, LOCK AND BRUSH MAKERS, AND ALL SPECIAL PURPOSES.

ALL KINDS OF FURNITURE SPRINGS.

IMPORTERS OF

IRON, STEEL, & RAILS

OF EVERY DESCRIPTION.

WIRE RODS. PLAIN AND GALVANIZED WIRES, &c.,
GUN BARRELS, MOULDS, AND ORDNANCE.

Shipments in bond from American Ports and direct from Europe to all parts of the World.

EXPORTERS AND GENERAL MERCHANTS.

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Direct all communications to the

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MILLER, METCALF & PARKIN,

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Manufacturers of

CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire,

Warranted equal to any imported in *quality, finish and accuracy.*

Also Common Grades.

Established 1810.

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Manufacturers of the "Celebrated

DOG BRAND" FILES.

Also of Superior

STEEL

For Drills, Cold Chisels, Tools, Taps, Dies, &c.

LD ROLLED STEEL for Clock Springs, Corsets, &c.
SHEET CAST STEEL for Springs, Saws, Welding and Stamping Cold, &c.
GERMAN, MACHINERY, ENGLISH AND SWEDES SPRING STEEL,
and all other descriptions for machinists and agricultural purposes.

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Manufacturers of the Celebrated

Cast and Double Shear

STEEL.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives, Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

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WILLIAM BROWN, Representative.

Cleveland Rolling Mill Co.,

Manufacturers of

BESSEMER STEEL

AND

Iron Rail and Fastenings,

SPRING STEEL

AND

WIRE OF ALL KINDS,

Tire, Axles and other Forgings,

Boiler Plate, Galvanized and Black Sheet Iron, Corrugated Roofing and Siding of Siemens-Martin, Bessemer Steel and Iron.

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Western Agency,	New England Agency,
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N. D. PRATT, Agent.	JOHN WALES & CO., Agents.

THE MIDVALE STEEL CO.,

NICETOWN, PHILADELPHIA.

Best Warranted Cast Steel for Machinists' Tools,

Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,

Extra Mild Center Steel, special for Taps,

ALSO,

MACHINERY AND CAST SPRING STEEL, HEAVY AND LIGHT FORGINGS.

Warehouse, No. 12 North 5th St., Philadelphia.

Address *A. M. F. Watson,* General Sales Agent.

STEEL

Gautier Steel.

See Page 3.

Steel.

NEWARK STEEL WORKS.

BENJAMIN ATHA & CO.,

Manufacturers of

BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND and other Steels for sale by

EDWARD FRITH & SON, Agents,

No. 241 Pearl St., New York.

LABELLE STEEL WORKS.

SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny.

Post Office Address, Pittsburgh, Pa.

Represented at Boston by WETHERELL BROS., 31 Oliver St.; at Milwaukee by JOHN PRITELAFF, 43 to 49 West Water St.; at Chicago by S. D. KIMBARK, 80 to 84 Michigan Ave.

ALBANY & RENSSELAER IRON & STEEL CO.,

Troy, N. Y.,

Office in New York City, 56 Broadway,

MANUFACTURERS OF

BESSEMER STEEL RAILS,

Machinery Steel, Merchant and Ship Iron.

HORSE SHOES.

SAM'L G. B. COOK & CO., Agents for Southern States,

67 and 69 German Street, Baltimore, Md.

FRANCIS HOBSON & SON

97 John Street, NEW YORK,

Sole Manufact'rs of "CHOICE" Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

CHAS. HUGILL, Agent.

THE

STEEL COMPANY OF SCOTLAND, LIMITED,

(SIEMENS' PROCESS,)

MANUFACTURERS OF

Steel Rails,	Steel Ship Plates,
Steel Blooms for Rails,	Steel Boiler Plates,
Steel Blooms for Wire,	Steel Angles,
Steel Wire Rods,	Steel Forgings,
Steel Locomotive Fire Boxes,	Steel Castings.

JAMES LEE & CO.,

Resident Agents for the United States,

72 Pine Street, New York.

GEO. SANDERSON & CO.,

MANUFACTURERS AND

Importers of STEEL,

Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS, TABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for CLOCK SPRINGS, CORSET CLASPS, &c.

A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

Warranted Superior to any Steel in the Market, either English or American, for every purpose.

Also,

Combination Chrome Steel and Iron for Safes, Jails and Deposit Vaults.

CHROME CAST STEEL.

Send for Circular and Price List.

Chrome Steel Works,
Kent Avenue and Keap Street,
BROOKLYN, E. D., N. Y.

Chicago Branch,
121 Lake Street,
MALCOLM McDOWELL, Manager.

Cincinnati Branch,
123 Central Avenue,
GEORGE KINSEY, Manager.

JOLIET STEEL COMPANY,

MANUFACTURERS OF

Steel Rails,

ALL WEIGHTS.

The Company Warrant its Rails equal in quality to any manufactured in the United States.

ALEX. J. LEITH, President. } W. R. STIRLING, Treasurer } C. E. SARGEANT, Secretary }

CHICAGO.

{ H. S. SMITH, General Sup't. JOLIET.

Office, Rooms D and E, Honore Building. **Works, Joliet, Ill.**

Steel.

R. MUSHET'S

Special Steel

FOR

LATHES, PLANERS, &c.

Turns out at least **double work** by increased speed and feed, **and cuts harder metals** than any other Steel. Neither hardening nor tempering required.

Sole Makers,

SAMUEL OSBORN & CO.,

Sheffield, England.

Represented in the United States by

B. M. JONES & CO.,

Nos. 11 & 13 Oliver Street, **BOSTON.**

NAYLOR & CO.,

99 John St., New York. 6 Oliver St., Boston, Mass.

W. R. HART, Agent,

208 S. Fourth St., Philadelphia, Pa.

THOS. J. HOYT, Agent,

709 North Second St., St. Louis, Mo.

MANUFACTURERS OF

STEEL COMPRESSED SHAFTING,

"Benzon" Homogeneous Plates

For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel,

And all other kinds of

Martin-Siemens Steel and Iron

For Railroad purposes, &c.

IMPORTERS OF

IRON AND STEEL RAILS,

SWEDISH IRON,

Tin and Terne Plates and Metals.

H. & A. CARTER,

1a Laurence Pountney Hill,

Cannon Street, London, E. C.,

Iron and Steel Merchants,

Exporters of Iron and Steel Rails, Blooms, Spiegeleisen, Pig Iron, Crop Ends, Old Rails and Scrap, Iron Ore, &c. Sole agents for the sale of the Vena Dulce (Somorrostro) Iron Ore from the Magdalena Mine. Shipping Port: Bilbao.

Analysis of "Magdalena" Ore.

Silica	4.05
Peroxide of Iron	84.60
Oxide of Manganese	1.65
Alumina	1.24
Lime	0.33
Magnesia	traces
Phosphoric Acid	0.04
Sulphuric Acid	0.42
Combined Water	5.97
Moisture	2.43
	100.43
Metallic Iron	59.22

The Sulphuric Acid exists as Sulphate of Lime and is, in my opinion, not detrimental.

Signed, E. D. RILEY, F. C. S.

Cable address:

HENRY CARTER, *London.*

B. FITTS PATENT MAGNETIC

METAL SEPARATOR,

Manufactured by

EZRA SAWYER,

33 Hermon St., *WORCESTER, MASS.*

Metal Workers' Crayons.

More convenient and cheaper than either common or French chalk. For manufacturers of all sheet metals, metal workers, machinists, blacksmiths, &c. Send for sample and price list.

D. M. STEWARD,

Sole Manufacturer,

231 State Avenue, *Cincinnati, Ohio.*

Gunpowder.

GUNPOWDER.

DUPONT'S

Rifle, Sporting and Blasting Powder

The most popular Powder in use.

Dupont's Gunpowder Mills, established in **1801** and **1802,** have maintained their great reputation for 78 years. Manufacture the following celebrated brands of Powder:

DUPONT'S DIAMOND GRAIN,

Nos. 1 (coarse) to 4 (fine), unequaled in strength, quickness and cleanliness; adapted for Glass Ball and Pigeon Shooting.

DUPONT'S EAGLE DUCKING,

Nos. 1 (coarse) to 3 (fine), burning slowly, strong and clean; great penetration; adapted for Glass Ball Pigeon, Duck and other shooting.

DUPONT'S EAGLE RIFLE,

A quick, strong, clean Powder of very fine grain for Pistol and Rifle shooting.

DUPONT'S RIFLE, Fg, "Sea Shooting,"

FFg and **FFFg.**—The **Fg** for long range rifle shooting, the **FFg** and **FFFg** for general use, burning strong and moist.

Also all kinds of Sporting, Mining, Shipping and Blasting Powders of all sizes and descriptions. Special grades for **export.** Also, Musket, Cannon, Mortar and Mammoth Powder, U. S. Government standard. Powder manufactured to order of any required grain or proof. Agencies in all cities and principal towns throughout the U. S. Represented by

F. L. KNEELAND, 87 Beaver St., N. Y.

N. B.—Use *none* but **Dupont's Fg** or **FFg** Powder for long-range Rifle shooting.

GUN POWDER.

Laflin & Rand Powder Co.

No. 29 Murray Street, New York,

Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as

ORANGE LIGHTNING,
ORANGE DUCKING,
ORANGE RIFLE

more popular than any Powder now in use.

Blasting Powder and Electrical Blasting Apparatus.

Military Powder on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.

Pamphlets showing sizes of grain sent free.

Steel.

NORTH CHICAGO ROLLING MILL CO.

ESTABLISHED 1857. CAPITAL, $3,000,000. INCORPORATED 1869.

Works at Chicago, Ill., and Milwaukee, Wis.

MANUFACTURERS OF

MERCHANT BAR, FISH PLATES, PIG METAL,

IRON RAILS & BESSEMER STEEL RAILS.

Present Annual Capacity of these Works.

Fish Plates	13,000 tons
Merchant Bar	40,000 "
Pig Metal	140,000 "
Iron Rails	110,000 "
Steel Rails	100,000 "
Total Capacity per year	403,000 "

OFFICES
17 Metropolitan Block, Chicago, Ill.
37 Mitchell Block, Milwaukee, Wis.

O. W. POTTER, President, CHICAGO.
N. THAYER, Jr., Vice-President, Boston.
S. CLEMENT, Treasurer, MILWAUKEE.
R. C. HANNAH, Secretary, CHICAGO.

THE MONTOUR IRON & STEEL COMPANY.

WORKS AT DANVILLE, PA.

PIG IRON, T AND STREET RAILS,

A general assortment of mine and narrow gauge rails kept on hand, from which shipments can be made promptly.

W. E. C. COXE, President, Reading, Pa. F. P. HOWE, Gen'l Sup't, Danville, Pa. S. W. INGERSOLL, Treasurer, 227 South Fourth St., Philadelphia, Pa.

THE SIEMENS-ANDERSON STEEL CO.,

Successors to ANDERSON & CO.,

Manufacturers of

Crucible Tool, Cast Spring, Cast Plow, Iron Centre, Soft Centre, and Iron Back Plow, also Open Hearth Spring, Tire, Plow, Machinery, and

ALL DESCRIPTIONS OF STEEL.

And Sole Proprietors of the Siemens Direct Process in the United States.

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BLACK LEAD STOPPERS

FOR

Bessemer Converters and Siemens-Martin Furnace Ladles.

All the regular sizes in stock, with nozzles to fit each size. Special sizes or shapes made to order from sample or drawing.

TAUNTON CRUCIBLE COMPANY — TAUNTON, MASS

CRUCIBLES

FOR

German Silver, Brass and Steel.

Jewelers' Crucibles,

Covers, Dips, &c.

FILE HARDENERS.

W. T. MACFARLANE,

Treasurer and Agent.

M. K. Moorhead. G. F. McCleane. W. J. Moorhead.

SOHO IRON MILLS.

MOORHEAD & CO.,

MANUFACTURERS OF

GALVANIZED SHEET IRON,

Juniata, Charcoal and Common.

Sheet & Plate Iron,

And Special Sizes for Sap Pans.

PITTSBURGH, - - - - PENN.

FIRST QUALITY.

SOHO CHB TRADE MARK

MOORHEAD & COMPANY NSI SOHO MILLS PITTSBURGH.

NOTICE.

Hereafter our **GALVANIZED SHEET IRON** will be branded as per cuts in margin. We have adopted these

TRADE MARKS

to protect ourselves and the trade against imitations of our iron, as was the case under our old brands.

MOORHEAD & CO.

January 1, 1881.

SECOND QUALITY

TRADE PLANET MARK

THIRD QUALITY

as heretofore

REFINED.

ELBA IRON & BOLT CO., Limited.

MANUFACTURERS OF

MERCHANT BAR IRON,

Skelp Iron, Splice Bars, Railway Track Bolts, Car, Bridge, and Machinery Bolts, Nuts, &c.

We invite the attention of RAILROAD MEN especially to our make of SPLICE BARS and Track Bolts. Using the best brands of REFINED IRON, and paying close attention to the finish of our manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent quality. Our works have been enlarged within a few years; all orders are now executed with promptness; all our work guaranteed.

SEND FOR PRICE LISTS AND INFORMATION TO

ELBA IRON & BOLT CO., Limited, Pittsburgh, Pa.

BELLAIRE NAIL WORKS,

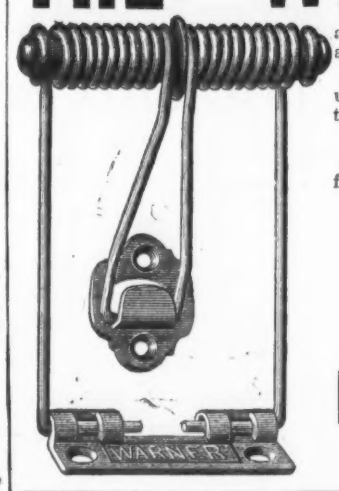
PIG IRON AND NAILS,

Manufacture the Celebrated Brand of

BELLAIRE NAILS,

Office and Works, **Bellaire, Ohio.**

THE "WARNER" DOOR SPRINGS



are the most simple, most effective and most convenient ever introduced, and the immense sale we are having shows their great popularity and superiority.

There never was a Spring made that is so durable, so complete in its action, operating with a uniform pressure, holding the door **tight** when **closed,** and allowing it to open without increasing the pressure at any point.

When the door is opened about 130 degrees of a circle, it will press and hold it open.

The Spring is easily **unhooked** and **rehooked**—in an instant—from the **door** and also from the **jamb,** without removing a **screw** or **pin.**

This is a Convenience Possessed by no other Spring in the Market.

We are making this season three sizes, viz:
No. 1 For Screen or Light Storm Doors.
No. 2 For Medium Doors.
No. 3 For Heavy Doors.
They are for sale by most of the prominent jobbers of the United States and Canada.
Correspondence solicited.

FREDERIC BARTLETT,

FREEPORT, ILLINOIS.

ESTABLISHED IN 1859.

THE IRONMONGER AND METAL TRADES ADVERTISER

PUBLISHED EVERY SATURDAY.

THE OLDEST AND CHIEF REPRESENTATIVE OF THE IRON, HARDWARE AND METAL TRADES.

OFFICE: 44a CANNON STREET, LONDON, E. C.

ADVERTISEMENTS AND SUBSCRIPTIONS ARE RECEIVED AT THE VARIOUS OFFICES OF "THE IRON AGE," NAMELY:

NEW YORK OFFICE: DAVID WILLIAMS, Publisher of *The Iron Age*, 83 Reade street.

PITTSBURGH OFFICE: 77 Fourth Avenue—JOS. D. WEEKS, Manager and Associate Editor.

PHILADELPHIA OFFICE: 220 South Fourth Street—THOMAS HOBSON Manager.

CINCINNATI OFFICE: Builders' Exchange—T. T. MOORE, Manager.

SOUTHERN OFFICE: Cor. Eighth and Market Streets, Chattanooga, Tenn.—S. B. LOWE, Manager.

SPECIAL FEATURES.

Notes of Novelties.—This is a department of the journal always watched with interest by the trade, as it contains an account, from week to week, of the novelties which manufacturers and inventors are introducing to the notice of the trade. These articles are freely illustrated.

Special Correspondents.—The *Ironmonger* has a deserved reputation for its special correspondence from all the principal Continental, British and manufacturing centers. The writers are gentlemen holding important positions in the districts with which they are connected, and possess facilities for acquiring information specially suited for the columns of the *Ironmonger*. ***The Week, Legal News, Trade Notes, Bankruptcies, Foreign Notes, Colonial Intelligence, Merchants' Circulars, &c.,*** are each departments of the journal, containing a digest of all matters of direct interest to the Iron, Hardware and Metal Trades. In addition to the above, there is a carefully classified list of Patents, together with Editorial Notes, French, Belgian and other Special Correspondence.

SUBSCRIPTIONS

to the *Ironmonger and Metal Trades' Advertiser*, with which is sent every fourth week the Foreign Supplement (see below), may commence from any date, but are not received for less than a year complete. The rate is $5 per annum, inclusive of postage to any part of the world outside Great Britain. To every subscriber is presented, free, in the course of his year, a handsome and useful ***Ironmongers' Diary and Text Book,*** a work sold to non-subscribers at 75 cents.

ADVERTISEMENTS

are inserted in the *Ironmonger and Metal Trades Advertiser* at the subjoined rates, from which no variation can be made on any ground whatever

Size of Page—Nine Inches Deep by Six Inches Wide.

One Advertisement of every Series of 13 Monthly, 27 Fortnightly, or 53 Weekly, will be inserted in the Ironmongers' Diary and Text Book, published toward the end of each year, and presented to every Subscriber.

	53 INSERTIONS, each net.	27 INSERTIONS, each net.	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.	1 INSERTION, net.
	Gold.	Gold.	Gold.	Gold.	Gold.	Gold.
One page	$20.00	$22.50	$25.00	$30.00	$35.00	$50.00
Two-thirds page	15.00	16.90	18.75	22.50	26.25	37.50
Half page	11.00	12.40	13.75	16.50	19.25	27.50
One-third page	8.00	9.00	10.00	12.00	14.00	20.00
Quarter page	6.40	7.25	8.00	9.60	11.20	16.00
One-sixth page	4.50	5.10	5.65	6.75	7.75	11.30
One-eighth page	3.60	4.10	4.50	5.40	6.25	9.00
One-sixteenth page	2.00	2.25	2.50	3.00	3.50	5.00

SPECIAL ISSUES.

In the spring and autumn of each year there is published a Special Issue, the circulation of which is not less than **Twelve Thousand (12,000)** copies.

THE IRONMONGERS' DIARY AND TEXT BOOK.

This is an annual, **presented free to every Subscriber to the IRONMONGER AND METAL TRADES' ADVERTISER.** It contains a large number of ruled skeleton pages for diary and other entries, and in addition much useful reference information, varied from year to year. It is handsomely bound in cloth, gilt; and as copies are used in thousands of establishments for a whole year, it is obviously a medium of exceptional value for advertisements. Sold to non-subscribers at 75 cents.

THE FOREIGN SUPPLEMENT

is published every fourth week in connection with the extensive and world-wide circulation of the *Ironmonger* itself. The dates of its publication for the next twelve months will be as follows:

MAY 28, JUNE 25, JULY 23, AUGUST 20, SEPTEMBER 17, OCTOBER 8, NOVEMBER 6, DECEMBER 3 and 31, JANUARY 28, FEBRUARY 25, MARCH 25, and APRIL 22, 1882.

This Supplement is published in

FIVE LEADING COMMERCIAL LANGUAGES

of the world, including English, and is sent to all the countries where they are spoken, thus placing the contents of the *Ironmonger* not only within reach but in the native language of eighty millions of *German*, forty-two millions of *French*, twenty-eight millions of *Italian*, and fifty-one millions of *Spanish* speaking people; or, in all, over two hundred millions of inhabitants in the principal nations where the best purchasers of manufactured goods are to be found.

Advertisements are inserted in *any* language at the following

MODERATE TARIFF.

Size of Page—13¼ Inches Deep by 9¼ Inches Wide.

	13 INSERTIONS, each net.	7 INSERTIONS, each net.	3 INSERTIONS, each net.
	Gold.	Gold.	Gold.
One page	$30.00	$33.75	$37.50
Two-thirds page	22.00	24.75	27.50
Half page	17.00	19.15	21.25
One-third page	12.50	14.10	15.65
Quarter page	$10.00	$11.25	$12.50
One-sixth page	7.50	8.45	9.40
One-eighth page	6.20	7.00	7.75
One-sixteenth page	3.20	3.40	4.00

Advertisers will do well to use Illustrations freely. Where economy of space is an object, a left page illustrated and described in one language can be suitably described in four or more languages on the opposite or right page without illustrating.

THE WHOLE FOREIGN HARDWARE TRADE,

so far as our experience of twenty years is concerned, will be covered by THE FOREIGN SUPPLEMENT at least twice a year. Thus a Price List or Advertisement inserted in the *Ironmonger* and FOREIGN SUPPLEMENT is a strikingly powerful and most efficient way of publicity not to be compared with any of the other ordinary channels of communication.

PHILADELPHIA.

(Corrected Weekly by Lloyd, Supplee & Walton.)

Terms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.
Peter Wrights, ℔ 10½c
Over 250 lbs. 11c
Eagle (American) ..... 10c ℔ —dis 20 %

Apple Parers.
Keystone Centennial, 1875 ..... $4.15
" 1877 ..... 5.00
Reading No. 72 ..... 5.00
" No. 74 ..... 6.00
" No. 75 ..... 7.00
" No. 78 ..... 7.50
Rotary Peach Parers 14.40
Lots of 10 to 25 dozen special prices.

Axes.
Hunt's Kentucky and Yankee ..... per doz $9.50
Mann's Red Warrior ..... " 8.50
Richland Chief ..... " 8.00
Beveled Axes ..... add 50c " net
Double Bit Axes ..... net 12.00

Augers and Auger Bits.—New List January 1.
Bates' Nut Augers ..... dis 40 %
Cook's Augers ..... dis 40&10 %
Watrous' Ship Augers ..... dis 15 %
Benjamin Pierce Auger Bits ..... dis 35 %
Griswold Auger Bits ..... dis 40 %
Cook's " ..... dis 40&10 %
Jennings' " ..... dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ℔ doz. .. dis 25&10 %
Stearns' Pat. Hol. Augers, list $48 ℔ doz .... dis 20&10

Balances.
Light and Common ..... dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells ..... dis 60&10 %
Swiss Pattern Hand Bells ..... low list dis 40&10 %
Connell's Door Bells ..... dis 20 %
Gt. Western & Kentucky Cow, new list ..... dis 50 %

Bolt and Rivet Clippers.
Chambers' No. 1. for ⅜ bolt ..... each, $7.50 } dis 15 %
" No. 2, " ½ " ..... " 9.00 }
" No. 3, " ⅝ " ..... " 12.00 }

Boring Machines.
Upright, without Augers ..... List 5.50 } dis 40 %
Angular, without Augers ..... " 6.75 }

Bolts.—Eastern Carriage Bolts ..... dis 80&5 %
Philadelphia ..... new list dis 70&10 %
Stanley, Wrought Shutter ..... dis 50&10 %

Braces.—Barber's ..... dis 40&5 %
Backus ..... dis 40 %
Spofford ..... dis 50&5 %
American Ball ..... dis 55 %

Butts.—Cast Fast Joint, Narrow ..... dis 45&10 %
" " Broad ..... dis 45&10 %
Cast Loose Joint, Narrow ..... dis 55&10 %
" " Broad ..... dis 55&10 %
" Acorn, Loose Pin ..... dis 55&10 %
" " Jap'd ..... dis 60&10 %
" Mayer's Loose Joint ..... dis 60&10 %
Wrought Loose Pin ..... dis 55&10 %
" Table Hinges and Back Flaps ... dis 50&10 %
" Narrow, Fast ..... dis 50&10 %
" Loose Joint ..... dis 55&10 %

Blind Butts.
Parker ..... dis 75
Clark ..... dis 75 %
Shepard ..... dis 60, 10&10 %
Lull & Porter ..... dis 66⅔&10 %
Huffer's ..... dis 50 %

Chains.—German Halter and Coil, new list Oct. 22, 1879 ..... dis 50 %
Galvanized Pump ..... ℔ b 10c net
Best Proof Coil Chain—English.

℔ ft.	12	10	8½	7⅛	7¼	7	gold
	3-16	¼	5-16	⅜	7-16	½	in.

Chisels.—Socket Framing ..... dis 65&10 %
Socket Firmer ..... dis 65&10 %
Butcher's ..... $5.00 to £ gold

Casters.—Bed (new list July 1, 1880) ..... dis 35&10 %
Plate ..... dis 35&10 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880 ..... dis 45 %
Enterprise ..... dis 25 %

Cutlery.—Walden Pocket ..... new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s ..... dis 65&10 %
Adjustable Handle ..... dis 15 %

Fry Pans.
Tinned ..... dis 45 %

℔ doz.	$3.50	4.00	4.50	5.00	5.50	6.50	7.50	9.00	10.00
No....	0	1	2	3	4	5	6		

Burnished ..... dis 60 %

℔ doz.	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00
Fo....	0	1	2	3	4	5	6	7	8

Files.
Nicholson ..... dis 30&10 %
Disston ..... dis 40 %
Butcher ..... $4.50 @ 4.75 £
Spencer ..... $4.50 @ 4.75 £
E. M. Boynton, new list ..... 25 %

Fluting Machines.
Eagle—3½ in. roll ..... each, $2.15 } dis 30 %
" —4¾ in. roll ..... " 2.85 }
Crown—4¾ in. roll ..... " 3.40 }
" —6 in. roll ..... " 4.00 } dis 20 %
" —8 in. roll ..... " 6.50 }
Geneva Fluter ..... dis 25 %
Favorite corn Fluter & Sad Iron ..... ℔ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list ..... dis 30 %

Handles.
Boynton's Pat. Saw Handles ..... 35c per pair net.

Hatchets.
Yerkes & Plumb, new list ..... dis 30 %
Hunt ..... dis 25%

Hinges.
Strap and T ..... dis 50&10&10 %

Horse Nails.

	Nos.	5	6	7	8	9	10
Ausable		30	27	24	24	23	22
"	P'l'd & P't'd and Blued and Pointed.	31	28	2	25	24	23
Globe	New list.	28	25	23	22	21	20
Clinton		22	20	19	18	17	
"	Polished & Pointed	23	21	20	19	18	

Porter, all sizes ..... ℔ b 15c. net
Discount on Ausable and Clinton, 30 %; Globe, 10%

Locks and Knobs.
Branford ..... dis 45&2 %
Gaylord Cabinet ..... dis 25&2 % cash
American Padlocks ..... dis 40 &2 % cash
Scandinavian Padlocks ..... dis 50 %
℔ doz. $5.00 5.50 6.50 7.50 8.50 10.20 12.50 } dis 60 %
No..... 57 58 59 60 61 62 63 }
℔ doz. $18.00 26.00 33.00 } dis 60 %
No..... 64 65 66 }

Lanterns.
Nail City ..... ℔ doz, $9.00 net
Square Candle and Oil ..... ℔ doz
Tubular ..... No. 0, $3.65; No. 1, $10.15 ℔ doz net
Globes, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania ..... } new list
Philadelphia ..... } dis 30 %
Excelsior ..... }

Lawn and Garden Pumps.
Holland Patent ..... List $4.00 dis 10 %

Matlocks.
Long and Short Cutter ..... new list .... 35 %
Pennsylvania Patterns ..... per doz 35 %

Molasses Gates.
Enterprise Mfg Co 's Measuring Faucets .... dis 25 %
Stebbins' Gates ..... dis 70&10 %
Lincoln's " ..... dis 50&10 %
Landers, Frary & Clark's Petroleum ..... dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1881 .... dis 40 %
Cork Lined " ..... dis 70 %

Meat Cutters.—Pennsylvania Meat Cutter. dis 40&10 %
Dixon's ..... dis 35 %
Woodruff ..... dis 35 %
Stowe ..... dis 30 %
Hale's ..... new list, dis 40, 10&2 cash
American ..... dis 25 %
Stuffers ..... dis 35 %
Enterprise Stuffers ..... dis 25 %

Planes.—Ohio Tool Co ..... dis 25 %
Scioto ..... dis 30 %
Auburn ..... dis 25 % } 10 %
New York Tool Co ..... dis 30 %
Bailey ..... dis 20&10 %

Plane Irons.—Ohio Tool Co ..... dis 20 %
Butcher's ..... £, $5.50

Plumbs and Levels.
Stanley's Adjustable ..... dis 65&10 %
" Non-Adjustable ..... dis 60&10 %

Picks.—New list ..... 35 %
Pumps.—Bickford ..... $5.00, dis 10 %
Rules.—Stanley Boxwood ..... dis 70&10 %
Stanley Ivory ..... dis 60&10 %

Steelyards.—Hart's Pattern ..... dis 30&10

℔ doz.	$14.50	17.75	21 00	26.50	31 00	35.50
Lbs ...	50	100	150	200	250	300

American Pattern ..... dis 30&10 %

℔ doz.	$8.00	10.25	13.75	15.00	16.75	19.50
Lbs.	50	100	150	200	250	300

Squares.
Steel and Iron ..... dis 50 %; full case, dis 50&10 %
Try Squares, Stanley ..... dis 50&10 %
Disston's Try Squares ..... dis 40 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened ..... ℔ doz $9.00 net
Clipper No. 10, Bronzed Blade, Boxed and Sharpened ..... ℔ doz $8.50 net
Clipper No. 5, Painted Red, Boxed and Sharpened ..... ℔ doz $8.00 net

Saws.—Disston's Hand, Panel and Rip ..... dis 20 %
Disston's Circular ..... dis 40 %
Cross-Cut No. 2, Plain Tooth ..... dis 40%
" Patent Tooth ..... dis 40%
" Champion Tooth ..... dis 40%
Boynton's Lightning Cross Cut, new list ..... dis 20 %
" One Man, all lengths, " ..... dis 20 %
" Billet Webs, 30 inch, " ..... dis 25 %
" Lightning Buck Saws, cross bar ... dis 25 %
" " Hand, Panel and Rip ... dis 25 %

Shovels and Spades.
Oliver Ames & Sons, new list ..... dis 12½ %
Griffiths ..... dis 40&10 %
Rowland ..... dis 40&10 %

Sad Irons.—4 to 10 lbs ..... ℔ b 35c
Mrs. Potts' Patent ..... dis 35 %

Stone.—Arkansas Oil Stone ..... ℔ b $2.00 net
Washita Extra ..... ℔ b 28c net
" No 1 ..... " 20c
" No. 2 ..... " 14c
" Slips ..... " 45c
" Axe ..... " 13c net
Turkey Oil Stone No. 1 ..... ℔ b $1.00 net
Hindostan Oil Stone No. 1 ..... ℔ b 6c } dis 30 & 10 %
" Axe Stone ..... " 8c }
" Slips ..... " 10c }

Screws.
Flat Head Iron ..... dis 40 %
" Brass ..... dis 40 %
Round Head Brass ..... dis 37 %
" Iron ..... dis 35 %

Spoons.
Plated ..... dis 40, 5&5 %
German Silver ..... dis 30, 10&5 %
Britannia, Boardman's ..... dis 70 %
" Parker's ..... dis 70 %
Tinned ..... dis 10 %

Springs.—Torrey ..... ℔ doz $2.10 10 %
Philadelphia .... 5 in., $6.00; 8 in., $7.00 ℔ doz. dis 25 %
Chatfield No. 1, $2.75; 2, $3.25; 3, $5.00 ℔ doz, dis 33⅓ %
Gem Coil No. 1, Large Jap'd ..... ℔ doz $3.50 }
" No. 2, Medium Jap'd ... " 2.50 } 25&10 %
" No. 3, Small Jap'd ..... " 2.00 }

Stocks and Dies. ..... dis 10&5 %

Stove Polish.—Gem ..... ℔ gross, $4.50, dis 5 %
Dixon ..... " 6.00, dis 10%
Onyx ..... " $4.00 @ 4.25 net

Tacks.
Shoe Nails—4 8, 6½c.; 3½-8, 10c ℔ b ..... 10 %
Double Pointed Tacks ..... dis 40&5 %

Traps.
Genuine Oneida—Newhouse ..... dis 30 %
Im. Oneida—Newhouse list, first qual ..... dis 55 %

Vises.—Solid Box, Trenton new list ..... dis 30 %

Wrenches.—Agricultural ..... dis 60&10 %
Coes' Genuine ..... dis 50 %
" " Mechanics' ..... dis 50&10 %
" " Mail Bar ..... dis 70&10 %
Philada. Tool Co., Duplex ..... dis

Wire.
Bright or Ann'd, No. 0 to 18 ..... dis 52½ to 55 %
" " No 19 to 26 ..... dis 57½ to 60 %
" " No. 27 to 36 ..... dis 62½ to 65 %
Coppered, 0 to 18 ..... dis 42½ to 45 %
Tinned Broom Wire ..... dis 45 to 47½ %
Galvanized No. 7 to 18 .... Market List, dis 32½ to 35 %

Wringers.
Peerless No. 2½ .....
" " 2 .....
Universal, No. 2½ .....
" " 2 .....
Novelty, No. 10 .....
" " 2 .....

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

The following are card rates. For discounts, prices etc., see weekly market report.

Flat Bar.
1½ to 4 by ⅜ to 1 inch 2.50
4¼ to 6 by ⅜ to 1 " 2.60
1¾ to 6 by 1¼ to 1½ " 2.90
1¾ and 1½ by ¾ to 2¼ " 2.60
1 and 1¼ by ⅜ to ¾ " 2.70
⅝, ¾ and ⅞ by ⅜ to ⅝ inch 2.90

Rounds and Squares.
1 to 1⅞ ..... 2.50 | ⅝ to 9-16 ..... 2.70
2 to 2⅜ ..... 2.70 | ½ to 7-16 ..... 2.90
2¾ to 3¼ ..... 3.00 | ⅜ 3.10
3⅜ to 4 ..... 3.50 | 5-16 ..... 3.30
4¼ to 5 ..... 4.00 | ¼ 3.50
5¼ to ⅞ ..... 2.60 | 3-16 ..... 5.50

Oval Iron.
⅞ to 1¼ ..... 2.90 | ⅛ 3.30
⅝ to ¾ ..... 3 10 | 9-16 ..... 3.70

Half Oval and Half Round.
⅞ to 1¼ inch ..... 3.20 | ⅛ inch 4.00
⅝ to ¾ " ..... 3.70 | ⅜ " 5.50

Horse Shoe.
⅝ to 1¼ by 5-16 to ⅞ inch 3.50

Wagon Box Iron.
⅞ Inch, Nos. 13 and 14 ..... 3.70
⅞ " " 11 and 12 ..... 3.50
⅝ " " 13 and 14 ..... 4.00
⅝ " " 11 and 12 ..... 3.80
⅝ " " 13 and 14 ..... 4.40
⅝ " " 11 and 12 ..... 4.10

Heavy Bands.
3½ to 6 by ¼ and 5-16 inch 2.70
1¾ to 3¼ by ¼ and 5-15 " 2.70
1 to 1¾ by ¼ and 5-16 " 2.80
⅝ to 1⅝ by ¼ and 5-16 " 4.00
⅝ and ⅛ by ¼ and 5-16 " 3.50

Light Bands.
1¼ to 6 by ⅛ to 3-16 ..... 3.00
1½ to 6 by Nos. 11 and 12 ..... 3 10
1 to 1⅜ by ⅛ to 3-16 ..... 3 10
1 to 1⅜ by Nos. 11 and 12 ..... 3.20
⅛ and 13-16 by ⅛ to 3-16 ..... 3.40
⅛ and 13-16 by Nos. 11 and 12 ..... 3.50
⅜ and 11-16 by ⅛ to 3-16 ..... 3.70
⅜ and 11-16 by Nos. 11 and 12 ..... 3.80
⅜ and 9-16 by ⅛ to 3 16 ..... 4.00
⅜ and 9-16 by Nos. 11 and 12 ..... 4.10
½ inch by ⅛ and 3-16 ..... 4.30
½ inch by Nos. 11 and 12 ..... 4.40

Hoop Iron.
1¼ to 4, Nos. 13, 14 and 15 ..... 3.30
1¼ to 2, Nos. 16, 17 and 18 ..... 3.40
1¼ to 2, No. 19 ..... 3.50
1¼ to 2, No. 20 ..... 3.60
1¼ to 2, No. 21 ..... 3.70
1¼ to 2, No. 22 ..... 3.80
15-16, 1, and 1⅛, Nos. 13, 14 and 15 ..... 3.50
15-16, 1, and 1⅛, Nos. 16, 17 and 18 ..... 3.60
15-16, 1, and 1⅛, Nos. 19 and 20 ..... 3.70
15-16, 1, and 1⅛, No. 21 ..... 3.80
15-16, 1, and 1⅛, No. 22 ..... 3.90
⅞, Nos. 13, 14 and 15 ..... 3.70
⅞, Nos. 16, 17 and 18 ..... 3.80
⅞, Nos. 19 and 20 ..... 3.90
⅞, No. 21 ..... 4.00
⅞, No. 22 ..... 4.10
13-16, Nos. 13, 14 and 15 ..... 3.90
13-16, Nos. 16, 17 and 18 ..... 4.00
13-16, Nos. 19 and 20 ..... 4.10
13-16, No 21 ..... 4.20
13-16, No. 22 ..... 4.30
¾, Nos. 13, 14 and 15 ..... 4.00
¾, Nos. 16, 17 and 18 ..... 4.10
¾, Nos. 19 and 20 ..... 4.30
¾, No. 21 ..... 4.30
¾, No. 22 ..... 4.40
11-16, Nos. 13, 14 and 15 ..... 4.30
11-16, Nos. 16, 17 and 18 ..... 4.40
11-16, Nos. 19 and 20 ..... 4.10
11-16, No. 21 ..... 4.50
11-16, No. 22 ..... 4.60
⅝, Nos. 13, 14 and 15 ..... 4.40
⅝, Nos. 16, 17 and 18 ..... 4.50
⅝, Nos. 19 and 20 ..... 4.60
⅝, No. 21 ..... 4.70
⅝, No. 22 ..... 4.80
9-16, Nos. 13, 14 and 15 ..... 4.60
9-16, Nos. 16, 17 and 18 ..... 4.70
9-16, Nos. 19 and 20 ..... 4.80
9-16, No. 21 ..... 4.90
9 16, No. 22 ..... 5.00
9-16, No. 23 ..... 5.10
⅛ inch, Nos. 13, 14 and 15 ..... 4 [illegible]
⅛ " Nos. 16, 17 and 18 ..... 4.90
⅛ " Nos. 19 and 20 ..... 5.10
⅛ " No. 21 ..... 5.20
⅛ " No. 22 ..... 5 30
⅛ " No. 23 ..... 5.40

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.
1¼ to 2 in., cut to length.
9 to 11 lbs, per set of 6 hoops 3.50
8 lbs. and less than 9 lbs. per set of 6 hoops 3.60
Less than lbs. per set of 6 hoops 3.80

Extras for Cutting to Length all Preceding Iron.
All Iron, including Tire 1.10c

Tank Iron.
No. 9 and heavier 3.30
Plow Slabs 3.50
" Wings 3.80

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.50	5.00	6.50
No. 15 to 17	3.80	5.30	6.80
No. 18 to 21	4.10	5.60	7.10
No. 22 to 24	4.30	5.80	7.30
No. 25 & 26	4.50	6.00	7.50
No. 27	4.70	6.20	7.70
No. 28	4.10	6.00	8.10

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.
1st quality (A) ..... 11c | 2d quality (B) 10c
Galvanized C. H. B.—(Charcoal Hammered Blooms.)
Nos. 14 to 20 ..... 12c | No. 27 ..... 15c
Nos. 21 to 24 ..... 13c | No. 28 ..... 16c
Nos. 25 and 26 ..... 14c | No. 29 ..... 18c
Current discount, 37½ % to 40 %.

Coal Screen Iron.
1¾ by ⅝ by 5-16 ..... 3.00 | 1 by ⅝ by 5-16 ..... 3.50

Angle Iron.
2½, 3, 3½ and 4 inch 3.30
1½, 1¾ 2 and 2¼ inch 3.30
1¼ inch 3.40
1 " 3.50
1¼ by 1 inch, for Plow Handles 3.80
1½ by ¾ " " " 3.80
1¾ by ¾ " " " 3.90

T Rail.
8 lbs. to the yard ..... 2.90 | 20 lbs. to the yard 2.80
12 " " ..... 2.80 | 28 " " 2.90
16 " " ..... 2.80 | 40 " " 2.80

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 28 and 30 lb. Rail, 50c. each; 40 lb., 60c each.

1¼ by ¾ and ⅛ Spikes for 20 and 28-lb. Rail 4.50
2½ and 3 by ⅜ " " 12 and 16-lb. " 4.30
2½ by 5 16 " " 8-lb. Rail 5.40

Flat Rails.—Punched and Countersunk.
1¼ to 2 by ⅛ to ⅜ inch 3.00
1½ by ⅜ and 7-16 inch 3.20
1¾ by ⅜, 7-16 and ½ inch 3.40
Junista Nail Rods 6.40
Norway " 8.00
Guard Iron, ¾x⅜x⅜ and ¾x⅝x⅜ 4.00
" ⅞x⅛x9-16 and ⅞x⅝x⅛ 4.20
Drag Bars 3 30
Dropper Bars 3.60
Cylinder and Landside Iron 3.20
Plow Beam Iron 3.00

Nails.
10d to 60d $3.15

Best Quality Refined Cast Steel.
Square, Flat, Octagon and Round.
⅜ to 2 inches, inclusive 11c
5-16 and 2¼ to 3 inches 12c
¼ and 3½ to 4 " 13c
7-32 and 4½ to 5 " 14c
3-16 and 5½ to 6 " 17c
5-32 inch 21c
⅛ inch 26c
Oil Well Steel Forgings 10½c
No grade of Crucible Tool Steel shall be sold for less than above prices.

Machinery Steel.

	Crucible.	Bessemer & Open Hearth.
Ordinary Sizes, ⅜ to 2 inch Round	6½c	5c
5-16 and 2⅛ to 3 inches	7½c	6c
¼ and 3¼ to 6 "	8½c	7c
7-32 inch	9½c	8c
3-16 "	11½c	10c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra.

Hammer Cast Steel.
2 inches and under ..... 7 c
Above 2 inches ..... 8 c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	12c	10c	8c	6c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ¼c. extra.

Miscellaneous Cast Steel.
Auger and Auger Bit 7c
Axle Steel for carriages and wagons 7c
Frog Points and Plates 8½c
" Side Bs 6½c
Pick, plain 7½c
" and Mattock, beveled 7½c
Skate Steel 7c
Table Cutlery 7½c
Pike and Cant Hook 7½c
Coal and Granite Wedge 7½c
Roller 6c
Spindle, subject to Machinery classification 7c
Trap Spring Steel 8c
Forged Crank Pins and Lathe Spindles 9c
Piston Rods, plain 6½c
" forged to shapes 7c
Slide Bars, plain 6½c
" forged to shapes 9c

Crucible, Open Hearth or Bessemer.
Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick .....
Boiler, Fire-Box and Flue Sheets, not less than ⅛ thick .....
Circulars and semi-circulars, when ordered separately .....
Smoke Stack, to shape .....
Locomotive Tank Steel .....

File Cast Steel.
Square, Round, Half Round and Flat Bastard, 8-inch and over 8c
Mill Saw, 8-inch and over 8½c
Taper, 3½-inch and over 9½c
Horse and Shoe Rasp 8½c

Spring Cast Steel. 6½c
Spiral and Taper, cut to lengths 7c

Tire Cast Steel.
1x¼ and over 7½c
1x3-16, ⅞x3-16 and ¼ 8c
1 and 13-10x¼ and 5-32, ⅞x3-16 and 5-32 ..... 8½c
¾ and ⅞x¼ and 3-32 and 12 g 9c
Solid Safe Cast Steel 7c

Agricultural Implement Cast Steel.
Fork and Rake, Crucible .....
Horse Rake Steel, cut to lengths, Crucible 7c
Hoe, Crucible 7½c
Corn Stalk Cutter, beveled 6½c
Beveled Hoe and Shovel Steel in Bars 7½c
Crucible Plow Steel in slabs 7½c

Bessemer and Open Hearth.
Spring 7c
" spiral and taper, cut to lengths 4½c
Tire, 3-16 thick and above 4½c
Toe Calk 4½c
Plow 4½c
Axle Billets 4½c
Sleigh Shoe 4c
Cutter Shoe, cut to lengths and tapered 4c
Scythe Back Steel 5½c
Grain Drill Bars 4c
" Points 7½c
Rolling Coulter Blanks, cut and punched 8½c
Thrasher Steel 9½c
" Teeth 4½c
Rolled Hammer Billets 5½c
Where Bessemer or Open-hearth Steel can be used in place of Crucible, the difference in price shall not be greater than 1c. per lb., except where especially provided in the list.
Terms.—Four months; 3 per cent. discount for cash, if remitted within 3 days.

Rolls and Castings.
Furnace, Floor and Straightening Plates 2½c
Housings and Castings not otherwise specified ..... 3 c
Guide Plates 3½c
Spindles and coupling boxes ..... 3 c
Sand Rolls and Pinions, large size ..... 3 c
" " small size 3½c
Pipe Mill Castings ..... 4 c
Rolling Mill Castings under 50 lbs ..... 4 c
Spur and Bevel Wheels, large 3½c
" " small 4½c
Pulleys up to 30 inches 4½c
" over 30 inches 4½c
Engine Castings, light 4½c
" " heavy ..... 4 c

Chilled Rolls.
6 to 7 in. diam., 7 to 20 in. long 4½c
8 to 15 in. " 8 to 40 in. " 4½c
25 to 24 in. " 15 to 72 in. " 4½c
14 to 31 in. " 72 to 108 in. " 4½c

White and Red Lead.
Strictly Pure White Lead in Oil, in kegs, 7c.; in 25 and 50 ℔ Tin Pails, ½c. ℔ b over keg price; 12½ ℔ Tin Pails, 1c ℔ b over keg price; assorted, 1 to 5 ℔ 100 ℔ Cases, 10c.
Dry White Lead ..... 7 c
Orange Mineral, genuine, in kegs, 9c; in barrels, 8½c
Red Lead, very brilliant, " 7c; 6½c
Litharge (Potter's Lead) " 7c; " 6½c
Freights equalized with all points.
Terms: Note at sixty days, or if paid within 15 days from date of invoice, a discount of 2½ per cent. will be allowed, but not otherwise.

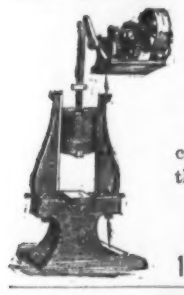
Window Glass.
Per Box of 50 Feet.—Discount 60&20 % on single strength, 70&5 % on double.

Single Strength.

Size.	AA.	A.	B.	C.
6 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18 x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.50
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9.50
26 x 46 to 30 x 50	15.00	14.00	11.25	10.50
30 x 52 to 30 x 54	16.00	14 00	12.00	
30 x 56 to 34 x 50	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	
Double Strength.				
6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 50	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

BEECHER & PECK,



Successors to Milo Peck, Manufacturers of

PECKS DROP PRESS

PECK'S DROP LIFTER is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.

Can be attached to any drop now in use.

Our New Illustrated Catalogue is just out.

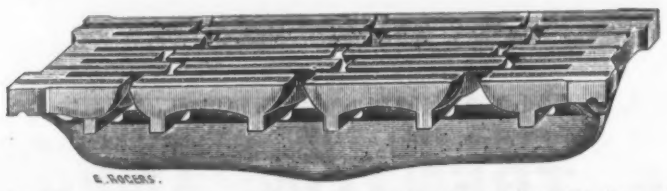
158 Temple Street, **New Haven, Conn.**

DAVID S. CRESWELL,

816 Race Street, - - - - PHILADELPHIA, PA.,

Manufacturer of

W. C. WREN'S PATENT GRATE BAR.



This Grate Bar consists of short parallel bars for carrying the coal, mounted above a long supporting bar, extending across the furnace by short transverse plates, holding the short bars, which sustain the heat so far above the supporting bar that it is kept comparatively cool, and is not, therefore, liable to warp, bend or burn. The bars which are subject to the heat, being made in short sections, do not strain the supporting bar. The short bars break joints at the meeting ends to prevent a straight open space across the whole; also to guide the rake used by firemen in cleaning the furnace better than they otherwise would.

We therefore claim the following advantages over other grate bars offered for sale:

1. Great saving in fuel.
2. Such construction as will equalize all strain resulting from expansion and contraction, thus avoiding warping, and thereby insuring long service.
3. Thorough combustion of fuel, owing to the large air spaces exposed.
4. Bars will not weigh more in proportion than the ordinary bar, and in addition to a saving of 25 per cent in fuel, will last much longer than any other bar in use.

The **WREN GRATE BAR** is in use at the works of the Atlantic Refining Co. and other prominent concerns.

MORSE TWIST DRILL AND MACHINE CO.

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,

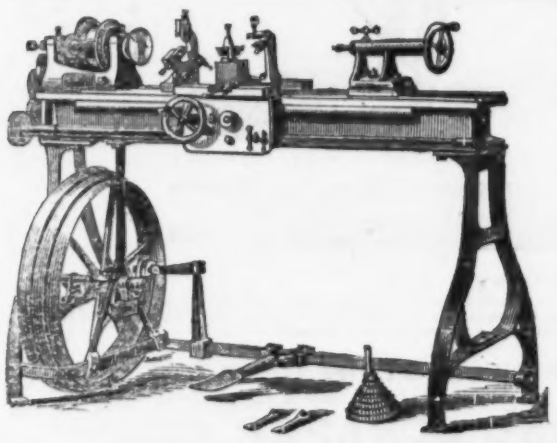
Beach's Patent Self-Centering Chuck, Solid and Shell Reamers,

BIT STOCK DRILLS,

DRILLS FOR COES, WORCESTER, HUNTER AND OTHER HAND DRILL PRESSES. BEACH'S PATENT SELF-CENTERING CHUCKS, CENTER AND ADJUSTABLE DRILL CHUCKS, SOLID AND SHELL REAMERS. DRILL GRINDING MACHINES. TAPER REAMERS, MILLING CUTTERS AND SPECIAL TOOLS TO ORDER.

All Tools exact to Whitworth Standard Gauges.

GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.



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TOOL & MACHINE WORKS,

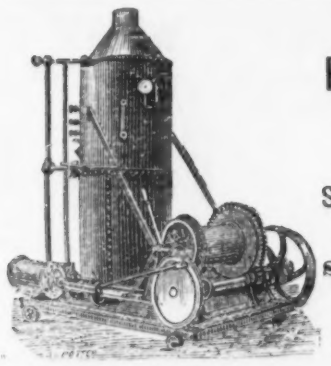
Manufacturers of

ENGINE, BRASS FINISHERS', WOOD TURNERS', AMATEURS' and JEWELERS' **LATHES.**

Slide Rest, Screw Machines, Turret Heads, Screw Presses, Screw Clamps, Lathe Carriers, &c.

440 N. 12th St., above Noble, Philadelphia, Pa.

Israel H. Johnson, Jr. *Joshua R. Johnson, Jr.*



A. J. DAVIS & CO.,

Patent Friction Hoisting Engines

For Mines, Quarries, Dock Building, &c.

MANUFACTURERS OF

SHAPERS, DRAIN PIPE MACHINES, BAG AND SATCHEL MACHINERY,

Steam Engines, Wire Drawing Machinery, &c., &c.

69 N. J. R. R. Avenue, Newark, N. J.

Correspondence solicited.

RIPLEY & KIMBALL,

Nos. 907, 909 & 911 N. Main St., ST. LOUIS.

IRON & STEEL BOILER PLATES & SHEETS.

Brass and Iron Fittings for Steam.

Lap-Welded Pipe & Boiler Tubes

RAILWAY AND BOILER MAKERS' SUPPLIES.

AGENCY NATIONAL TUBE WORKS CO.

THORNE, DeHAVEN & CO., Drilling Machines,

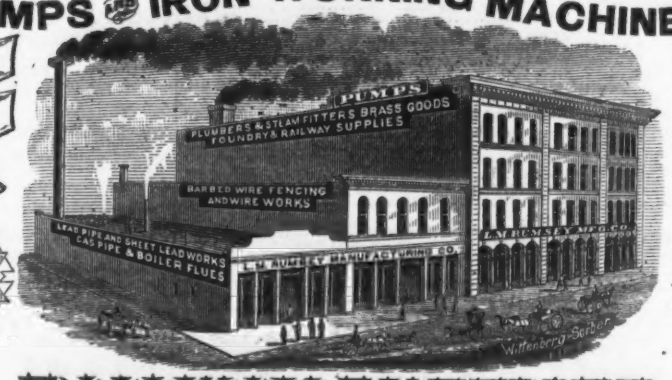
21st Street, above Market, Philadelphia.

PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
VERTICAL DRILLS. Self-feeding.
MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BORING AND DRILLING MACHINES.
HAND DRILLS. **CAR BOX DRILLS.**
SPECIAL DRILLS, For Special Work.

L. M. RUMSEY MFG. CO.

MANUFACTURERS & JOBBERS OF

PUMPS & IRON WORKING MACHINERY,



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PLUMBERS & STEAM FITTERS BRASS GOODS

BARBED WIRE FENCING & FENCE WIRE

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BELTING HOSE, PACKING,

PUMP CHAIN &c.

RAILWAY SUPPLIES

No 804 TO 820 N. SECOND ST.

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Bradley's Cushioned Helve Hammer

Awarded first premium, Silver Medal, at American Institute Fair, 1873; Cincinnati Industrial Exposition, 1874 and 1880, and the Diploma of Honor and Grand Medal of Merit at the Centennial Exhibition in 1876, being the highest award given any goods of their class in America or Europe. It has more good points, does more and better work, takes less power, costs less for repairs, than any Hammer in the world. Guaranteed as represented. Established 1832.

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BRADLEY & COMPANY, Syracuse, N. Y.

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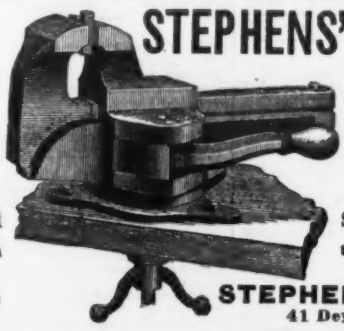

Stationary and Swivel Bottoms.

The Best in the Market.

For Sale by the Trade.

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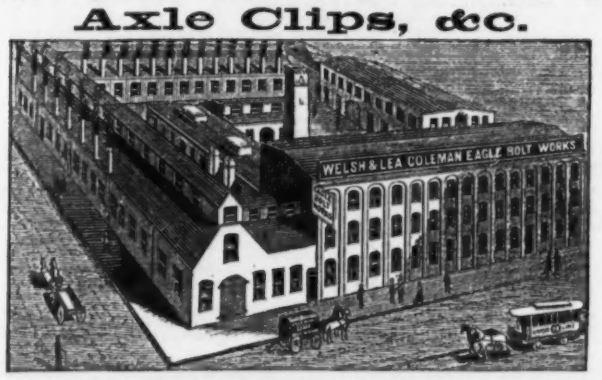
41 Dey Street, New York.

NORWAY IRON CARRIAGE & TIRE BOLTS,

Axle Clips, &c.

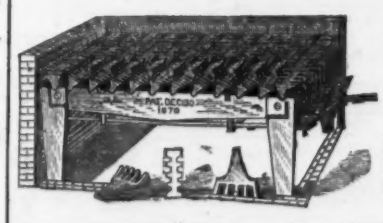


Only Medal, Philadelphia, 1876. Only Medal, Paris, 1878.

COLEMAN EAGLE BOLT WORKS,
WELSH & LEA, Philadelphia, Pa.

ROCKING BLOCK GRATE,

Williams' Patent,



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Fire level. Accumulation of cinders impossible. No cleaning out of fires during the day. Parts easily and cheaply replaced. Seventy per cent. of air space. Thirty days' trial. Send for circular.

COMBINED SHEAR & PUNCH

A Bench Tool made in Two Sizes.

This tool can be secured to a bench. It is a very effective and convenient little tool. Prices very low. No. 1 cuts ½ inch iron; No. 2 cuts 3/16 to ¼ inch iron.

Manufactured by

J. E. HULL,
No. 137 East Pearl St., Cincinnati, O.
Send for Circular and Price List.

THE FALLS RIVET CO. NORWAY IRON RIVETS

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Tinned Belt Rivets and Burrs a specialty.

THE LA FRANCE FIRE ENGINE CO.

Manufacturers of

Rotary Steam Fire Engines

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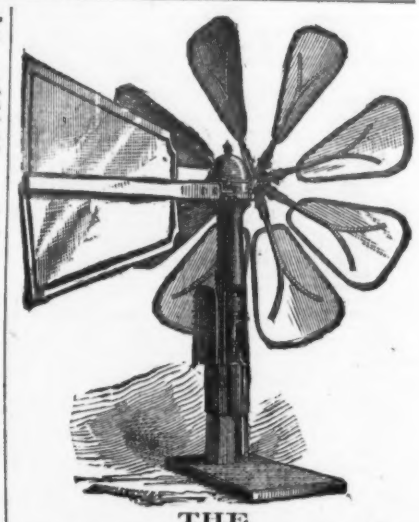
Portable Forges,

All sizes, for the lightest to the heaviest work, run by Chain Gear and Flat Belts. Strong blast and durable. Send for Catalogue and Price list to

KEYSTONE Portable Forge Co., 904 N. Fourth St., Philadelphia.



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HARTFORD COMPRESSED AIR PUMP

Water Driven to any Hight and Distance by Compressed Air.

Country Houses Supplied Cheaply and Certainly for Bath Rooms, Water Closets, Hot and Cold Water Faucets, &c. Plenty of Fresh Water for Stock on Farms. The best Pump for Irrigating, supplying Railroad tanks, and for Mining purposes. For Circular and Price list address, **EZRA BROOKS,** Sec'y and General Manager of The Hartford Compressed Air Pump Co., **Hartford, Conn., U. S. A.**

WITHEROW & GORDON,

Engineers & Contractors,

PITTSBURGH, PA.

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WHITWELL

HOT BLAST STOVES.

OVER 600 IN USE.

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Cedar Point Iron Co., N. Y.
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Chester Rolling Mill Co., Pa.
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Isabella Furnace Co., Pa.
Paxton Furnaces, Pa.
Spearman Iron Co., Pa.
Etna Iron Works, Ohio.
Milton Coal and Iron Co., Ohio.
Winona Furnace Co., Ohio.
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Hocking Valley Iron Co., Ohio.
Cleveland Rolling Mill Co., Ohio.
Meier Iron Co., Ill.
North Chicago Steel Co., Ill.
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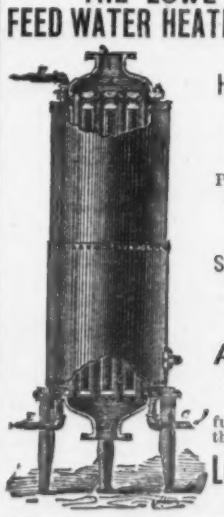
Means & Culbertson, Ky.
Ashland Furnace Co., Ky.
Norton Iron Co., Ky.
Southern States C., I. and S. Co., Tenn.
Sewanee Furnace Co., Tenn.
James C. Warner, Rising Fawn, Ga.
Ohio Iron Co., Zanesville, O.

THE LOWE PATENT

FEED WATER HEATER & PURIFIER.



FOR

Heating and Purifying Water for Steam Boilers.

Patented July 12, 1877.

Has Straight Tubes.

SIMPLICITY, RELIABILITY and EFFICIENCY

At Less Cost

Than any Other.

Write for prices and further information to the manufacturers,

Lowe & Watson,

BRIDGEPORT, CONN.

FARLEY'S PATENT

Rubber-Cushioned Casting Brush.

Superior to any in the Market.

Manufactured and for sale in the

L. B. FLANDERS MACHINE WORKS,

1025 Hamilton St., Philadelphia.

Descriptive Circular on application.

BOSTON.

Reported by Macomber, Bigelow & Dousse.

Anvils.—"Eagle American" ₩ lb 9½c. dis 20 %
Anvil & Vise,—
No. 1, $4.25; 2, 4.25; 3, 3.50 each ... dis 25 %
Augurs & Bitts.—Snell's Auger ... dis 40&10 %
L'Hommedieu's Shio Augers ... dis 15 %
Jenning's Bitts ... dis 10&10 %
Cook's Bitts ... dis 40&10 %
Sheparuson's Double-Cut Bitts ... dis 45 %
" Gimlets ... dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₩ doz, $48.00, No. 3, ₩ doz, $60.00 list, dis 20 %
Bonney's Extension Hollow Augers ... ₩ doz $16.00
Pierce's Bitts ... dis 40 %
Griswold " ... dis 40&10 %
Axes.—Blue Jackets ... per doz 9.00
Red Cross ... per doz 8.00
" Handled ... per doz 12.00
Dowse " Boys' ... dis 33⅓ %
Ax Handles.—
Oak Extra, 31 in., No. A ... ₩ doz $2.00
" 34 in., No. A ... ₩ doz 2.25
" 31 in., No. B ... ₩ doz 1.50
" 34 in., No. B ... ₩ doz 1.75
" 31 or 34 in., No. C ... ₩ doz 1.15
Axle Clips ... dis 60 %
Balances.—Chatillon's ... dis 15&10 %
Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers) ... per ft. 3c
" Half-Round ... per ft, ⅝, 3½c; ⅞, 4c
Wrought " ... per ft, ½, 4c; ⅝, 5c; ⅞, 6c
Bells.—Connel's Crank Gong reduced list ... dis 20&10 %
Bird Cages.
Japanned M. B. & D., reduced list, 1879 ... dis 40 %
Brass " 1879 ... dis 33⅓ %
Blind Fasts.—Lock Fasts ... ₩ C sets $6.00
No. 6 Fasts ... ₩ C sets 6.50
Veazie Fasts ... ₩ C sets 6.50
Shedd's ... ₩ C sets 7.00
Blind Hinges.—Mall. Hook, 3 holes ... ₩ C sets 8.50
Brad Awl Handles.—
Phœnix Adjustable ... ₩ doz $2.00
Bolts.—Norway Iron Carriage ... dis 70&5 %
Common " ... dis 80&5 %
Borax.—Refined ... ₩ lb 14½c
Boring Machines.
Eagle Upright each, $5.50 list ; dis 50&10%
Eagle Angle each, 6.75 list ;
Snell Augers ... ₩ set 2.43
Braces.—Barber's ... dis 40 %
Spofford's ... dis 50 & 5 %
Backus' ... dis 50 & 10 %
Bracket Saws.—Holly Scroll Saw ... each, $2.50
Demas Lathe and Scroll Saw ... " 6.50
Bracket Saws, extra quality, to No. 0 ... ₩ gro $0.75
Steel Frame, with patterns ... ₩ doz 6.50
Lester ... dis 20 %
New Rogers, all iron ... dis 25 %
Bracket Saw Blades.
Grimth's patent ... ₩ gross 75c
Brackets.—B. B. & M. Flower Pot reduced list— ... dis 25&10 %
Bronzed Shelf, B. B. & D. newlist ... dis 50&10 %
Store Shelf ... dis 40&10 %
Bronze Hardware.—
Butts.—Union Fast Joint ... dis 45&10 %
" Loose " ... dis 55&10 %
" Japanned Acorn ... dis 55&10 %
" Silvered " ... dis 55&10 %
" Boston Finish ... dis 75&10 %
Union Spiral Spring ... dis 25&10 %
Wrought Brass ... dis 75 %
Carriage Bolts.—Eagle Norway ... dis 70&5 %
" Common ... dis 80&5 %
Carriage Jacks.
"Climax" No. 1 ... ₩ doz $20.00
" No. 1½ ... " 15.00
" No. 2 ... " 12.50
"Universal" ... dis 25 %
" No. 1 ... each, $2.00
" No. 2 ... " 3.00
" No. 3 ... " 6.00
" No. 4 ... " 6.00
" No. 5 ... " 6.50
Cartridges.—U. S. Cartridge Co. ... dis 70 %
Cards.—Watson's makeHorse and Curry ... dis 10 %
" Cotton ... dis 10 %
" Wool ... dis 10 %
Casters.—Bed and Table ... dis 35&10 %
Chain.—Traces 6½, 10, 4, straight ... ₩ pair 45c
" 6½, 10, 4, twisted ... ₩ pair 60c
" 7, 12, 2½ " ... ₩ pair 75c
Coil 3-16 ... ₩ lb 11 c
" ¼ ... ₩ lb 8 c
" 5-16 ... ₩ lb 7 c
" ⅜ ... ₩ lb 6 c
" 7-16 ... ₩ lb 5½c
" ½ ... ₩ lb 5½c
Chalk.—White, Carpenter's ... ₩ gross 90c
Red, Carpenter's ... ₩ gr 60 & 80
Blue ... ₩ gross $1.00
Chisels.—Hart, Bliven & Mead, Framing ... dis 50&10 %
Underhill, Framing ... dis 20 %
Buck's Chisels ... dis 30 %
Clothes Line.—
Galvanized Wire, 100 feet each ... ₩ doz $4.00
Coni Hods.—"Dover."—Galvanized, new list ... dis 50 %
Japanned, new list ... dis 40 %
Coffee Mills.—New list ... dis 33⅓ & 10 %
Copper Rivets ... dis 33⅓ %
Cow Ties ... dis 33⅓ %
No. 3, 3 ft. No. 6 Wire, with toggle ... ₩ doz $3.00
No. 3, 3 ft. " " with snap ... ₩ doz 3.80
No. 4, 3½ ft. " " with toggle ... ₩ doz 3.50
No. 4, 3½ ft. " " with snap ... ₩ doz 4.10
No. 5, 4 ft. No. 4 " with toggle ... ₩ doz 4.50
No. 5, 4 ft. " " with snap ... ₩ doz 4.75
No. 6, 4½ ft. " 3 " with toggle ... ₩ doz 5.50
No. 6, 4½ ft. " " with snap ... ₩ doz 6.00
Cocks.—Brass, L. F. & C. ... dis 40 %
Cordage.—Manila, usual trade dis 10 ... ₩ lb 14½c
Jute ... ₩ lb 9c
Crow-Bars.—Cast Steel ... ₩ lb 8c
Iron, Steel Pointed ... ₩ lb 5c

Cutlery.—Pocket, American Shear Co.'s ... dis 40 %
Butcher Knives, "Woods," Lap Bolster, Square Handle ... dis 30 %
Steak Knives ... dis 20%
Lap Bolster, Oval Handle ... dis 10 %
Sticking ... dis 20 %
Skinning ... dis 30 %
Butcher, Common Round Handle, "Woods" ... dis 20 %
Shoe Knives, "Woods" ... dis 20 %
Dividers.—Cook's ... dis 25 %
Dog Collars ... dis 20 %
Dog Muzzles.—Automatic ... dis 10 %
Door Springs.—Torrey's Rod ... ₩ doz $2.00
Imitation Torrey's Rod ... ₩ doz $1.75
Gem Coil, new list ... dis 33⅓ %
Crown ... ₩ doz $1.25
Warners ... ₩ doz $2.00
Door Stops.—"Thurston's" ... dis 50 %
Drawer Knobs.—"Thurston's" ... dis 40 %
Drills.—Morse Bitt Stock ... dis 20 %
Morse Straight Shank ... dis 20 %
Emery.—Wellington Mills ... ₩ lb 10c
Walpole Emery Mills ... ₩ lb 6c
Turkish in 10 lb cans ... ₩ lb 8c
Enamelled Ware.
Standard Mfg. Co. Kettles ... dis 10 & 10 %
" Sauce Pans ... dis 25 %
Felloe Plates.—Wrought ... ₩ lb 9c
Files.
American File Co ... dis 40 %
Nicholson " ... dis 40 %
Fluting Machines.
Knox list, $2.00 ... dis 20 %
American list, $3.40 ... dis 20 %
Forks. W. C. & Co., Manure ... dis 50 %
Gimlet Bitts.
Genuine German, No. 125, 1-32 to 8-32, per doz $1.12
Pierce's ... per doz 88c
Glass Cutters.
Combination Glass Cutter and Knife Sharpener ... ₩ doz $1.0
Grub Hoes.—K. P. & Co.'s No. 2, 11.50 ₩ doz ... dis 30 %
Hammers.—Maydole's ... dis 10 %
Hartford Hammer Co ... dis 20 %
Hangers & Rollers.—Anti-Friction ... dis 5 & 10 %
Acme Rollers ... dis 40 %
Climax ... dis 50 %
Common Hangers ... dis 30&10 %
" Rollers ... dis 33⅓&10 %
Hand Screws ... dis 10 %
Hatchets.—C. F. Dowse new list ... dis 33⅓ %
Underhill ... dis 25 %
Hay Knives.—Lightning ... ₩ doz $18.00 net
Fisher's Patent ... ₩ doz @14.00
Hinges.—Strap and T (new list) ... dis 50&10&10
Providence Plate ... ₩ lb
Wrought Screw Hook ... ₩ lb
Hoes.—W. C. & Co.'s ... dis 50 %
Hooks and Staples.—Brewers' ... new list, dis 70 %
Horse Nails. No. 6 7 8 9
National Finished ... .23 .21 .20 .19 ... dis 20 %
Putnam Pointed ... .28 .26 .25 .24 ... dis 10 %
Horse Nails.—Bridgewater ... dis 25 %
No. 6 22; No. 7, 21; No. 8, 20; No. 9, 19.
Ice Cream Freezers.—"Packer's" new list dis 40 %
Knobs.—"Norwalk." New list ... dis 45 %
Silver Glass ... dis 50&10 %
" Bell Pulls ... dis 50&10 %
Lanterns.—Guarded No. 99 ... ₩ doz 7.50
Tubulars, No. 0 ... ₩ doz 8.00
Railroad, Oil, No. 43 ... ₩ doz 9.00
Triangular ... ₩ doz 4.00
Hurricane ... dis 20 %
Lawn Mowers.—The "Daisy."
12 in. cut ... each, $8.50
14 in. cut ... " 9.00
16 in. cut ... " 9.50
18 in. cut ... " 10.00
Lead.—Sheet ... ₩ lb 7 c
Pipe ... ₩ lb 9½c
Locks.—Norwalk Genuine Bronze Goods ... dis 45 %
Eagle Cabinet ... dis 25 %
" Trunk ... dis 15 %
W. Wilcox & Co., Padlocks ... dis 40 %
Manure Forks.—W. C. & Co ... dis 50 %
Mattocks.—K. P. & Co., Long Cutter, 16.00 ₩ doz.
K. P. & Co., Short Cutter, 15.00 ₩ doz ... dis 50 %
" Pick " 16.00 ₩ doz ... dis 50 %
Measuring Tapes.—Eddy's ... dis 20 %
Meat Cutters.—Miles' Challenge ... dis 30 %
Hale's, (New list) ... dis 40 & 10 %
American ... dis 20 %
Money Drawers.—Tucker's Alarm ... ₩ doz $22.50
Mouse Traps.—Delusion ... ₩ doz 2.00
Novelty ... ₩ doz 75
Nails ... dis 40 %
Oilers.—Zinc and Tin ... dis 10 %
Brass and Copper ... dis 40 %
Ox Bows.—Extra finished and varnished ... dis net
1¼ in., ₩ doz. pair, $4.75 | 2 in., ₩ doz. pair, $8.00
1¾ in., " " " 8.00 | 2½ " " " 11.00
Padlocks.—W. Wilcox & Co.'s ... dis 40 %
Paper.
Tarred Sheathing ... ₩ lb, 2½c
Tarred Eagle Brand ... ₩ lb, 2½c
Picks.—K. P. & Co., Adze Eye, 5 to 6 lb 12.00 ... dis 30 %
" " 6 to 7 lb 13.00 ... dis 30 %
Planes.—Auburn Tool Co ... dis 25 & 10 %
N. Y. Tool Co ... dis 40 & 10 %
English Iron ... dis 20 & 10 %
Bailey's ... dis 20&10 %
Plated Ware.—Hoeche & Bro ... dis 50 & 5 %
Pliers.—Vom Cleff & Co.'s ... net list
Burton's Wire Pliers ... dis 33⅓ %
Plumb & Levels.—Stanley, R. & L. Co ... dis 60&10 %
Pocket Knives.
American Shear Co.'s ... dis 40 %
Potato Diggers.—W. C. & Co. reduced list ... dis 50 %
Pulleys.
Acme or Excelsior, 1¾ in ... per doz 2.10
" 2 in ... " 2.40
Pulley Blocks ... dis 40 %
Pumps.—Union Manufacturing Co.
Iron Cistern ... dis 50 %
" Pitcher Spout ... dis 50 %
Copper ... dis 50 %
Rivets.—Black ... dis 60 %
Carriage in 10 lb papers ... dis 35 %
Copper ... dis 35 %
Razors.—Torrey's ... dis 10 %
Razor Strops.—Torrey's ... Full line
Rules.—Stanley ... Boxwood, dis 70&10 %
" Ivory, dis 60&10 %
Sadirons.—Common ... ₩ lb 3½c
Laundry ... ₩ lb 6½c
Tailor's Geese ... ₩ lb 13
Enterprise, "Potts" ... ₩ lb 13
Sash Locks.—King & Hutchinson's, new list ... dis 10 %
Saddpaper.—Baeder & Adamson ... dis 25 %
M. B. & D. ... dis 25&10 %
Sash Weights.—Patent Eye ... ₩ lb 1½c
Saws.—Hand Saws, Disston's ... dis 20 %
Wheeler & Clemson ... dis 20
Cross-Cut Saws.
W. M. & C., Common Tooth, No. 1 ... ₩ foot 35c
" " Champion " ... ₩ foot 35c
Disston's, Common " ... ₩ foot 50c dis 40&5
" Gt. American " ... ₩ foot 75c dis 40&5
Brynton's Lightning " ... ₩ foot 75c
M. B. & D., Hand Saws ... ₩ foot 40c
W. M. & Co.'s Circular Saws ... dis 25 %
Richardson Bros ... dis 25 %
Saw Blades.—Disston ... dis 20 %
W. M. & C ... dis 10 %
Welch & Griffith, Extra ... ₩ doz $8.40
" No. 2 ... ₩ doz 7.00
Scales.—Fairbanks ... dis 20
Screws.—Aiken's Flat-Head Iron ... new list, dis 40 %
American Flat-Head Iron ... " dis 40 %
" Brass ... " dis 40 %
" Round-Head " ... " dis 30 %
" Iron " ... " dis 35 %
Grilley " Nickel-plated Common ... dis 60 %
Scythes.—Clippers, in boxes ... ₩ doz $9.50
Shaves.—Kimball's ... ₩ inch 75c
Watrous ... ₩ inch 75c
Shears.—American Shear Co., new list ... dis 10 %
Shot.—Tatham's ... ₩ lb 7½c
Shovels.—O. Ames, new list ... dis 12½ %
O. Ames, other brands, new list ... dis 12½ %
M. B. & D ... dis 12½ %
Oxford Birmingham Pattern ... dis 40 %
Sinks.—Magee Patent ... dis 30 %
Snow Shovels.—Malleable tips ... 9.00
Skates.—Union ... dis 40 %
Acme ... dis 25 %
Stock and Dies.—King's ... dis 10&5 %
Taps.—A. Field & Son's ... dis 37½ %
Pittsfield ... dis 5 & 10 %
Swedes Tinned ... dis 10 %
Swedes Iron ... dis 10 %
Gimp and Lace ... dis 5 %
Copper Tacks ... dis 5 %
All balances on list ... dis 10 %
Traps.—Oneida, Genuine ... dis 33⅓ %
Oneida, Imitation, H. & S ... dis 50 %
Blake's ... dis 10 & 10 %
Vises.—Simpson's Adjustable ... dis 20&5 %
Howard Vise Co ... dis 25 %
Prentiss' ... dis 25 %
Weather Strips.—Packer's ... ₩ doz $1.50
Browne's Flexible Rubber ... dis 30 %
In 25 feet boxes: No. 1, ½ in. wide, ₩ yard 10c. No. 2, ⅝ in., 15c. No. 3, ¾ in., 20c.; No. 4, 1 in., 25c.
Black Walnut Spring Weather Strips ... ₩ doz. $3.00
Window Springs ... dis 20 %
Babcock's No. 3 ... ₩ gross $6.00
" " 4 ... ₩ gross 4.50
Wire Cloth.—"Clinton" ... ₩ ft 0
Wire Fence.
Scutt's Patent, Painted ... ₩ lb 8½c
" Galvanized ... ₩ lb 9½c
Wire Goods.—Gate Hooks and Eyes, &c. new list ... dis 65&10 %
Wrenches.—A. G. Coe's ... dis 50 & 10 %
Girard Mfg. Co ... dis 50 %
Girard Agt ... dis 70 %
Wringers.—Universal, No. ... ₩ doz $24.00
Universal, No. 2½ ... ₩ doz 26.00
Novelty, No. 10 ... ₩ doz 45.00
Excelsior, No. A ... ₩ doz 75.00
" No. B ... ₩ doz 83.00
" No. CC ... ₩ doz 105.00
Novelty Set Tub, E ... ₩ doz 60.00
Eureka ... ₩ doz 48.00
Keystone, Wood Frame No. 1½ ... ₩ doz 42.00
" Iron Frame No. 2½ ... ₩ doz 42.00
Zinc ... ₩ lb
Withington, Cooley & Co.—Hoes, Rakes, Forks &c dis 50 %. Special rates for Export.

ELEVATORS.

PASSENGER ELEVATORS,
FREIGHT ELEVATORS,
HYDRAULIC ELEVATORS.

Hydraulic Elevators to Run from City Pressure.
Condensed Air and Hydraulic Elevators Operated by Steam Pump.
Independent Steam Elevators.
Belt Power Elevators.
Portable Hoisting Machines.

All Kinds of Hoisting Machinery a Specialty.

STOKES & PARRISH,

3001 Chestnut St., Philadelphia.

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Furnace Lamps

which are superceding entirely the Tin Lamps wherever introduced, in consequence of their durability. They are now extensively used in the Iron Districts of Ohio and some in Pennsylvania.

We call your attention to and solicit your order for them, confidently asserting that they are an **A No. 1 article in every respect.**

Sample sent if desired.

PRICE, $12 PER DOZEN.

Taylor & Boggis,

CLEVELAND, O.

$ $ $ $ **SAVED** $ $ $ $

1977 NINETEEN HUNDRED SEVENTY-SEVEN 1977

MACHINES

BOTH NEW AND SECOND-HAND

COMPRISING MACHINE AND BLACKSMITH TOOLS OF EVERY DESCRIPTION. WOOD-WORKING MACHINERY IN ALL ITS BRANCHES. PORTABLE ENGINES. UPRIGHT and HORIZONTAL STATIONARY ENGINES, 1 TO 300 HORSE POWER. **S.C.F.&CO.** LOCOMOTIVE FIRE-BOX, HORIZONTAL, and UPRIGHT BOILERS, 1 TO 100 HORSE POWER. WATER WHEELS, COTTON AND WOOLEN MACHINERY, STEAM PUMPS, GRISTMILL MACHINERY, Etc., FULLY DESCRIBED, AND PRICES ANNEXED,

☞ Send stamp for same,] In our List No. 23. [stating what you want. ☜

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Manufacturers of

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For Working Sheet Metal

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Near Clinton st., BUFFALO, N. Y.

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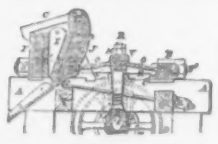
New Haven Conn.



BLAKE'S Challenge Rock Breakers.

Patented Nov. 18, 1879.

See *The Iron Age* first issue of the month.

ASBESTOS MATERIALS, FIBER, MILLBOARD, PACKING AND CEMENT.

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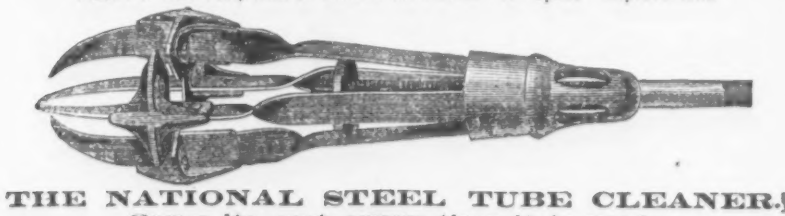

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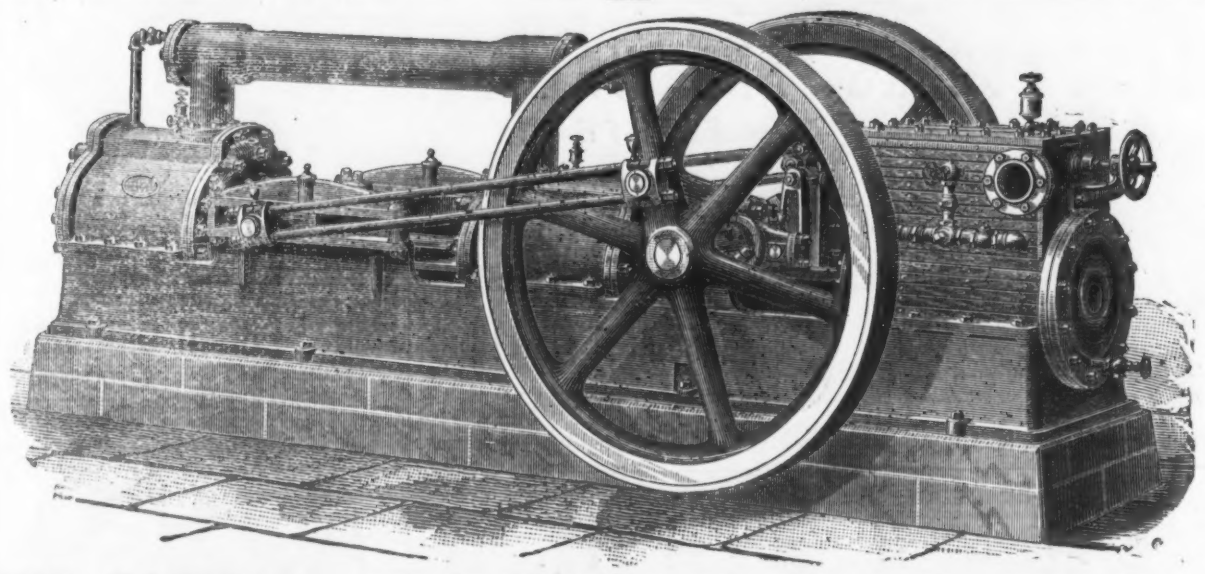

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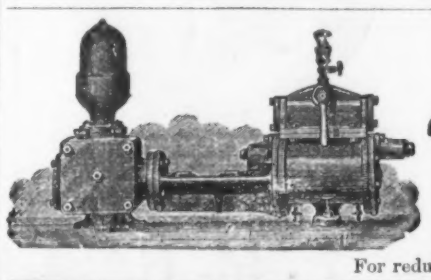

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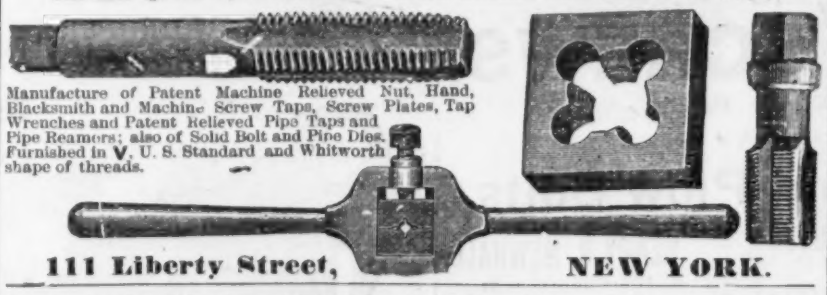

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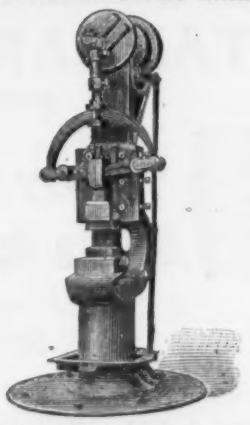

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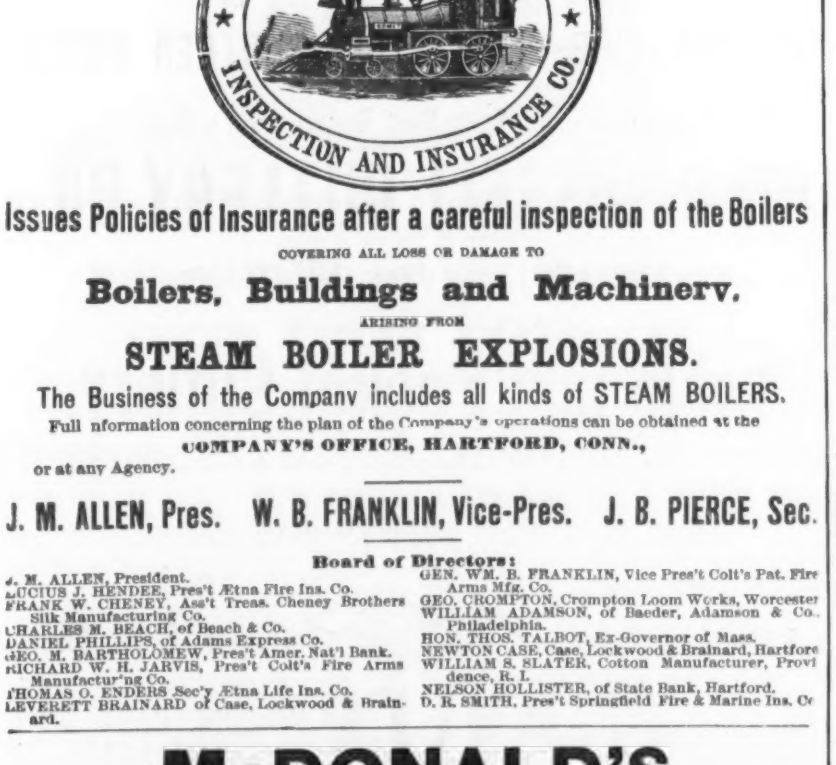

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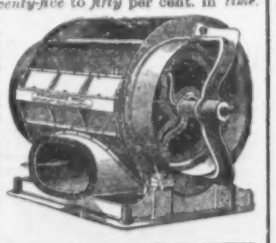

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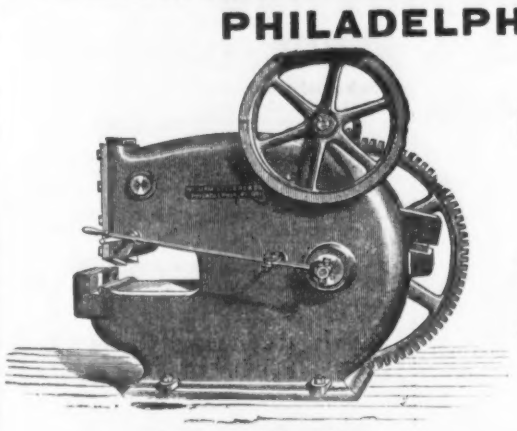

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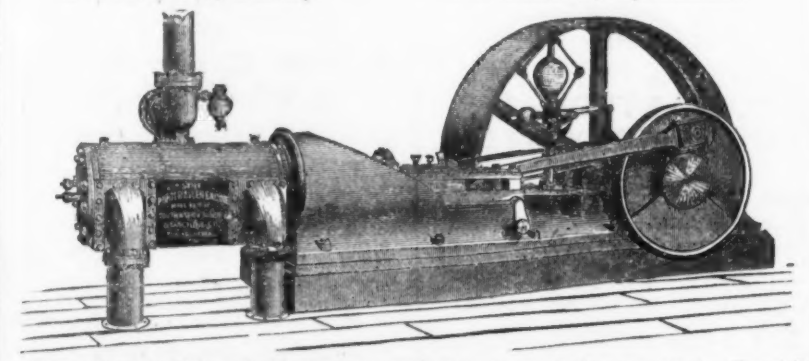

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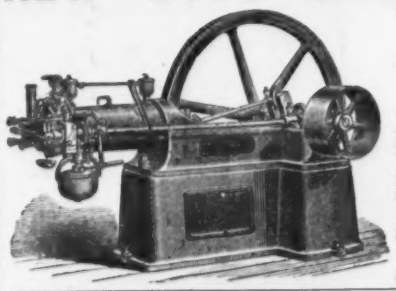

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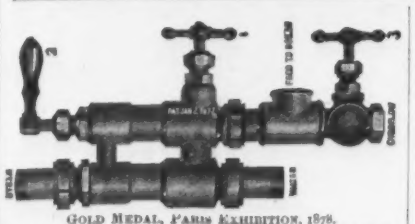

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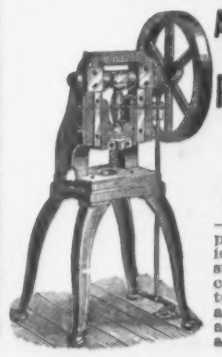

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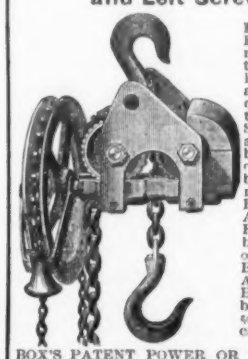

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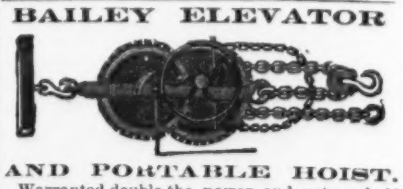

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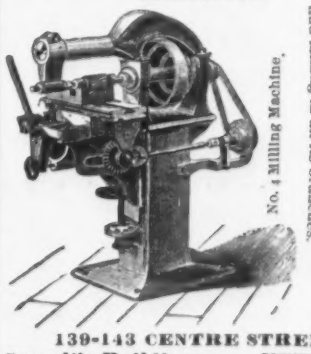

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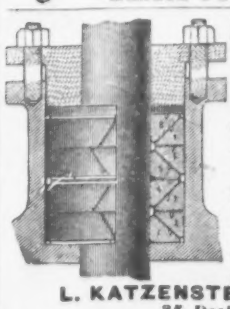

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